

December 1993/\$3.00

Mobile Radio Technology™

The journal of mobile communications technology

Includes

Buyers' Guide Information

- ❖ Product Directory
- ❖ Services Directory
- ❖ Company Addresses
- ❖ Brand Names Directory
- ❖ Trade Associations
- ❖ Index to 1993 Features



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Circle (4) on Fast Fact Card

features

8 1994 Buyers' Guide

MRT's annual directory provides you with essential information you will want to retain for quick reference year-round. Products and services are listed, as well as trade associations and brand names.

12 Product Directory

More than 90 categories of equipment for the mobile radio industry are listed, as well as more than 750 suppliers. Advertisers in this issue are listed in blue.

52 Services Directory

Mobile radio services such as consulting, repair and training are listed, as well as the companies that offer them. Advertisers in this issue are shown in blue ink.

56 Company Addresses

An alphabetized index of suppliers and service providers appears in this section. Regional sales contacts are listed for some of the advertisers in this issue.

94 Brand Names Directory

Sort out which company belongs to specific mobile radio industry brand names in this alphabetized listing.

96 Trade Associations Directory

Addresses and phone numbers for various mobile radio trade groups are provided for quick reference.

28 Index to 1993 features

All of the 1993 articles plus two departments, *Regulating Technology* and *Technically Speaking*, are indexed by subject. Keep this as a reference to find articles printed in 1993.

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Robert H. Schwaninger Jr.
The FCC as "industry" umpire only "calls them if it sees them."

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On the cover: Two-way radio supports fire department communications. Photo courtesy of Motorola, Schaumburg, IL.

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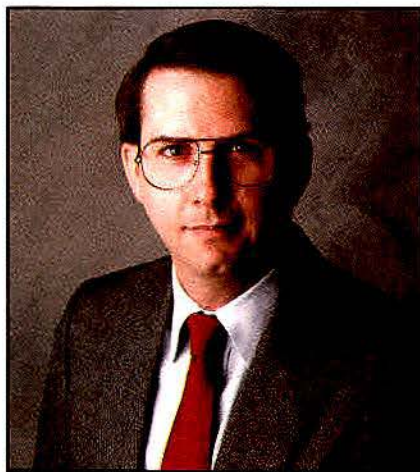
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Scanning . . .



Simmonds and Midland

Harry Dunstan, chief operating officer of Simmonds Communications and president of its SCL Inc. subsidiary, called to talk about changes stemming from SCL Inc.'s purchase of Midland International for \$10.6 million.

Midland International has annual sales of \$64 million in land mobile, citizen band, marine and amateur radio products. Simmonds is a mobile radio manufacturer, distributor and systems integrator. It is the exclusive Canadian distributor for Midland and Philips two-way radio products, and it has the North American sales rights to Mobicom radio systems products.

SCL Inc. will include two business units, Midland Systems, and Midland International. The top spot at Midland Systems has yet to be filled. Richard Looney heads Midland International. Midland LMR sales vice president Scott Henderson moves up to executive vice president for both business units.

► **Midland Systems**—A new business unit, Midland Systems, is a systems integrator for large land mobile radio systems. "Systems integration involves quite a bit of project management and custom application engineering," said Dunstan, who is looking for someone to head the Midland Systems business unit in Kansas City.

Switching equipment is a key component of systems integration. "Mobicom has been a historic supplier to the tier 1 players," he said. "The switching product will have a Midland label, and Midland people will be

brought up-to-speed on applying, installing and servicing that switching equipment."

Dunstan has prepared hiring and restructuring plans, but until a budget is approved, he will not specify how many people are expected to be employed by Midland Systems.

► **Midland International**—The second SCL Inc. business unit is Midland International with its existing land mobile radio and consumer product divisions. Former Midland International president Richard Looney, who was on hiatus from Sept. 16 to Nov. 2, has returned as president of Midland International to head that business unit.

We asked Dunstan whether Midland International would be developing products using digital technologies.

"The primary supplier to Midland is Hitachi," Dunstan explained. "Meetings are being held between Simmonds and Hitachi to decide the correct spin on Hitachi-Midland projects. Hitachi has digital modulation technology, and we're bringing on stream another large original equipment manufacturer supplier that has digital technology."

As for 220MHz, Dunstan said that Simmonds has announced memorandums of understanding with Securicor PMR Systems that apply to Midland. Securicor, with headquarters in Bath, England, has developed 220MHz conventional and trunked radio products for use in the United States, pending the grant of FCC type acceptance.

The creation of a systems integration business unit at Midland and the development of new products indicate continued growth in the land mobile radio industry, and that's good news.

We're pleased to hear about the jobs that will be created in the Kansas City area and in other locations as Midland Systems begins operation.

We wish Midland continued growth and success as a part of Simmonds Communications.

* * *

Teeny radio

Motorola's Visar FM transceiver shrinks portable two-way radio technol-

ogy into an 11-ounce, 8-cubic-inch package.

It's teeny.

People are getting used to teeny wireless devices, thanks to cellphone miniaturization. Even though industrial and public safety users are accustomed to relatively larger two-way radios, many have seen enough of the small consumer products to prefer a pocket-size radio.

Kirk Allard, the company's product planning manager for the Conventional Radio Products Division's Radio Products Group, and Gail Prejean, vice president of Customer Connection for Motorola Communications and Electronics, stopped by our office to demonstrate and talk about the new unit.

We asked Allard what technological advances are represented in the product. He listed a new level of integrated circuit chip miniaturization, an innovative speaker and a compact configuration of nickel-metal hydride (NMH) cells in the battery power supply.

"One thing portable radio users tell us," Allard said, "is that no matter how small the radio becomes, the audio needs to be loud and clear." A speaker manufacturer developed a tiny driver for Motorola that handles 500mW of audio.

Allard said the radio's NMH battery chemistry offers somewhat higher capacity than nickel-cadmium (NiCd) chemistry, and more importantly, the NMH cells can be configured roughly in the shape of chewing gum strips to fit a thin battery case.

Prejean said some people will use the radio as a talk-back pager, thanks to its signaling and LCD capabilities that emulate tone and digital paging features. "The radio is not much bigger than a pager," she said.

She envisions some consumer applications for the radio, too, pending certain regulatory approvals.

Visar comes along during the 50th anniversary year of Motorola's introduction of the first portable FM two-way radio, the 35-pound SCR-300 "walkie-talkie" developed for the U.S. Army Signal Corps during World War II.

By the way, "Visar" stands for "very innovative small analog radio," in case you want to know.

—Don Bishop

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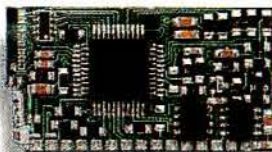
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1994

February

7-8—AMTEX, the American Mobile Telecommunications Association's Marketing and Technology Conference and Exposition, Marriott on International Drive, Orlando, FL. Contact: 202-331-7773.

March

2-4—Cellular Telecommunications Industry Association Winter Meeting and Exposition, San Diego. Contact: 202-785-0081.

6-9—Energy Telecommunications and Electrical Association, Henry B. Gonzales Convention Center, San Antonio. Contact: 214-235-0655.

April

13-15—International Wireless Communications Expo/Spring, Las Vegas Convention Center, Las Vegas. Contact: 303-220-0600.

May

2-5—Supercomm, sponsored by USTA and TIA, and International Conference on Communications, sponsored by IEEE, New Orleans. Contact: USTA, 202-835-3100.

12-14—Mobile Communications Conference, sponsored by the National Association of Business and Educational Radio (NABER), Peabody Hotel, Orlando, FL. Contact: Nancy Palleschi, 800-759-0300.

25-27—RadioComm, Vancouver Convention Center, Vancouver, British Columbia. Contact: Bill Eggertson, 613-233-4888.

June

7-11—Vehicular Technology Conference, sponsored by IEEE Vehicular Technology Society, Stockholm, Sweden. Contact: Professor Sven-Olof Ohrvik, technical chairman, 46 8 757 0483; Fax 46 8 34 8441.

18-20—International Public Safety Exposition and Conference, sponsored by the International Association for Public Safety, Dallas Convention Center, Dallas. Contact: 203-847-9679.

18-23—Utilities Telecommunications Council, Washington Sheraton, Washington, DC. Contact: Rita Clark, 301-621-7802.

July

17-20—Forestry-Conservation Communications Association, Hershey, PA. Contact: Don Pfohl, 602-644-3166.

August

6-11—International Municipal Signal Association, Cavanaugh's Inn, Spokane, WA. Contact: Harold Glerum, 800-723-4672.

7-12—Associated Public-Safety Communications Officers National Conference, Lawrence Convention Center, Pittsburgh. Contact: 800-824-1850.

September

22-24—Mobile Communications Marketplace, Washington State Convention Center, Seattle. Contact: 800-326-8638.

October

3-5—WirelessWorld Conference & Exhibition, sponsored by Cellular Business magazine, The Stouffer Orlando Resort, Orlando, FL. Contact: Stephanie Hanaway, 913-967-1856.

15-20—International Association of Chiefs of Police, Albuquerque Convention Center, Albuquerque, NM. Contact: 703-243-6500.

19-21—International Wireless Communications Expo/Fall, Tampa Convention Center, Tampa, FL. Contact: 303-220-0600.

November

18—Radio Club of America, Communications Symposium, Annual Dinner and Awards Presentation, New York Athletic Club, New York. Contact: Ron Formella, 201-652-6811.



Mobile Radio Technology

The journal of mobile communications technology

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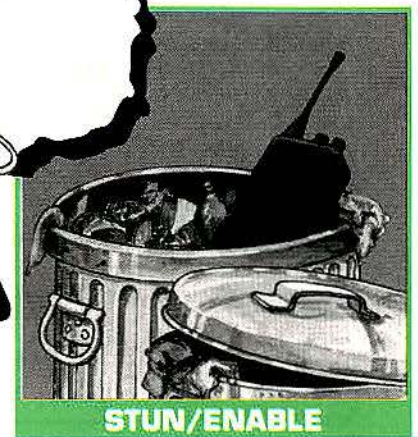
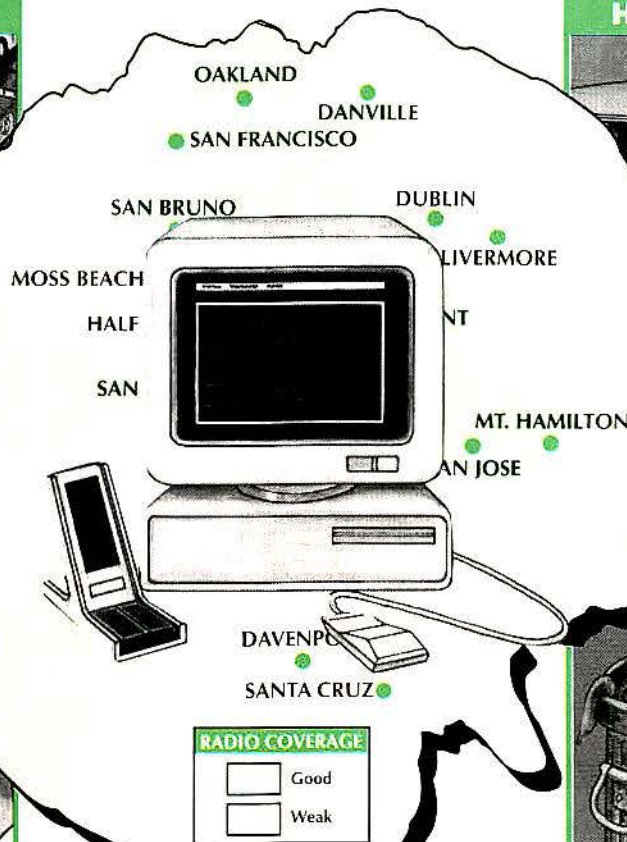
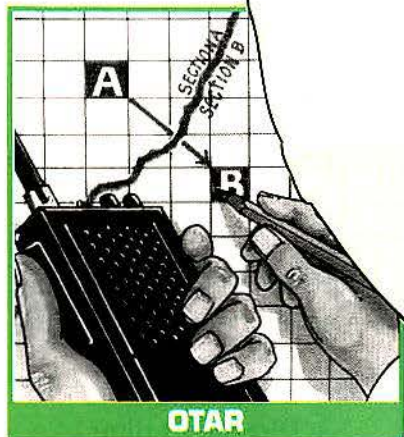
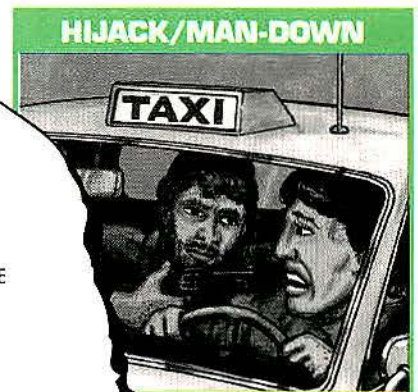
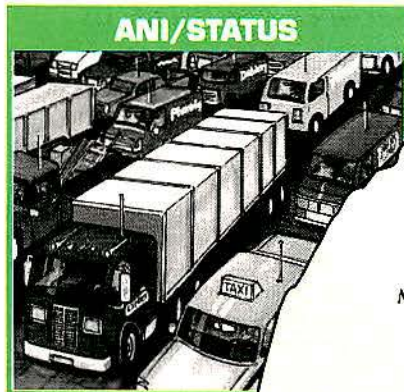
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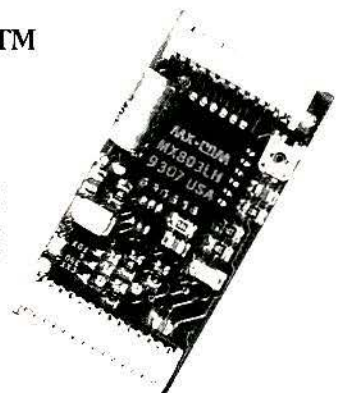


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7th Annual 1994 Buyers' Guide

MRT's annual directory provides you pertinent information you will want to retain for quick reference year-round. Products and services are listed, as well as trade associations and brand names.

MRT editorial staff

Welcome to the annual directory issue of *Mobile Radio Technology*. We believe you will find it a complete product and services source for the mobile radio industry.

Industry authorities and our editorial advisory board helped us to establish informative categories and to compile data. We mailed questionnaires to suppliers and service companies, and we asked them to list the products and services they offer. This "Buyers' Guide" is designed to be an easily used reference for an entire year. It is divided into five sections: **Product Directory**, the **Services Directory**, **Company Addresses**, **Brand Names Directory** and **Trade Associations**.

The **Product Directory** lists more than 90 categories of equipment and suppliers. Under each heading is a complete list of the companies that have that particular product available. More than 750 companies are listed.

Under the product headings, you will find **companies listed in blue**. These companies are advertisers in this issue, and the page location serves as direct reference for additional information about the manufacturers which can be obtained either by contacting them or using a Fast Fact number assigned to the advertisements and returning the Fast Fact Card bound in the back of this issue. (See page 131.)

The **Services Directory** follows the

Product Directory and lists 11 services categories and the companies that provide them. Here again, you will find **blue listings for advertisers** in this issue.

Following the product and services directories, you will find an alphabetized index of **Company Addresses**, as well as phone numbers, for all companies listed in this "Buyers' Guide." Regional sales contacts are also listed for some of the advertisers in this issue.

The **Brand Names Directory** is an alphabetized list of brand names in the mobile radio industry and the associated manufacturers of these products.

As part of our directory, *MRT* sorts out the various trade groups in the industry in our

Trade Associations listing. Here you will find the addresses and phone numbers of the numerous trade associations representing mobile radio interests.

For your convenience, two Fast Fact Cards are bound into this issue. Each card is valid for a full year. By circling the appropriate numbers associated with manufacturers' and services companies' advertisements, you can obtain additional information directly from the product or service source.

The editorial staff has made every attempt to make this "Buyers' Guide" an accurate and comprehensive listing of suppliers and services companies in the mobile radio field; nevertheless, because of

the number of suppliers in this field and because new entrants always are surfacing in this industry, products or services may have been overlooked. If you represent one of these companies or organizations, please send your company's name and address to Carl Bentz, *MRT* Directory Editor, P.O. Box 12901, Overland Park, KS 66282-2901. This will help to make the "Buyers' Guide" an even better reference next year.

**To be listed in next year's
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For use with the November 1993 issue of MRT

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Circle (900) on Fast Fact Card

Of course your customers will like it.
After all, they designed it.



As usual, we consulted the experts before designing our new XLT Series pagers; your customers.

They told us what they're really looking for in a high-end pager. The kind of things that help them where they live: in the real world.

That's why every XLT Series pager can store up to 30 messages with up to 24 characters each, along with a time stamp to keep them in order, for

those days when the calls just keep on coming.

We've also built in an out-of-range indicator, programmable wake-up screens, variable alert tones to separate the urgent from the ordinary, and a long list of other real-world assets.

So don't be surprised if the XLT Series turns out to be exactly what your customers want. After all, they asked for it.

uniden[®]

Real Pagers for a Real World.

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For more information about Uniden Pagers, call 1-800-292-2294 today.

Product Directory

See Adv. Page

See Adv. Page

See Adv. Page

See Adv. Page

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Appropriate Data Communications
Auto-Trac
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Com-Ser Labs
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Compuquest
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Repeco
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Communications Div.
RTI Communications
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Company Addresses begin on page 56

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"We bought our Motorola R-2600s for features, ease-of-use, and quality. As an independent two-way service business we are always looking for equipment that will help us get the job done right. Computerized, digital accuracy, with an analog feel. Dependable on the job. I particularly like its software upgrades. Our regular use of the R-2600 is on the bench, but when necessary (just about every day) we take it to the mountain."



Bob Wendt

Bob Wendt, Manager
Phoenix Technical Operations
Canyon State Communications



For more information call 1-800-235-9590

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Communications Associates 24
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Glenayre Electronics
Henry Radio 87
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Lunar Industries

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R/M Wholesale Communications
Radio Wholesale Marketing
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Communications Associates 24
Jack Daniel Company
Decibel Products 39
Eastcom Industries
EMR 74
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Over Land, Over Sea, Via Air.

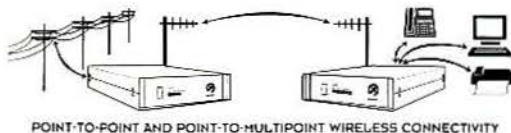


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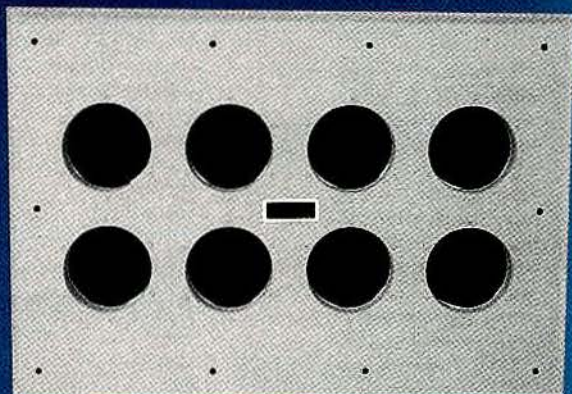
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Alpha Industries
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Antenna Specialists 1FC
Auto-Comm Engineering
Cartwright Communications 103
Celwave 18-19
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ANTENNAS

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Advanced Cellular of Philadelphia
Advanced Fox Antennas
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Antennas America
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Comtelco Industries 91
Cushcraft/Signals 17
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Hustler 23
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Kenwood USA 45
Kintronics Labs



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LBA Technology
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Manon Engineering
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MCM Electronics
Metrocom Services
MFJ Enterprises
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Mobile Mark 87
Modublox & Company
Morcom International
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Motorola Land Mobile Products Sector
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Williamson Rd Rk	Calhoun Hall	Greenhills	Indian Hill
Glendale W.T. Rk	Cheviot	Engineers	Miami Heights
Comm Center	Comm Center	Glendale W.T.	Calhoun Hall
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Mariontown Rk	Mt. St Joseph	Repeater Ctrl Dis	Mariontown
Calhoun Hall	Engineers	Comm Center	Milford
	Miamitown	Indian Hill Rk	Cheviot
	Harrison	Miami Heights Vote	Cleves
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The Smartswitch II™ Remote Comparator Display monitors and controls voting receiver systems on a personal computer or console. It can be used locally or remotely with leased-line or dial-up modems.

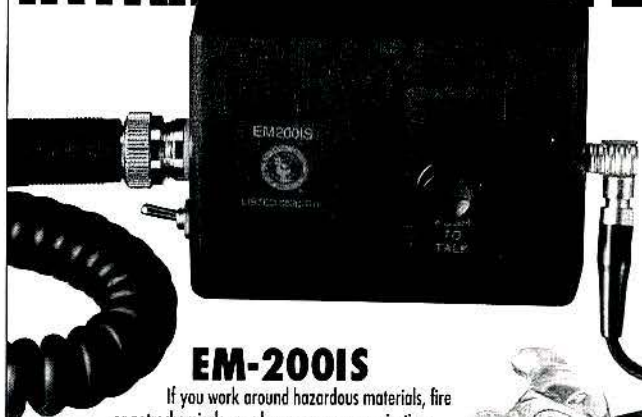
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Circle (15) on Fast Fact Card

Take A Look At Our Brass

After a Cushcraft/Signals antenna has been installed, you won't see the UltraLink Cable,TM the all-brass mount or the silver-plated contacts. Quite simply, you won't see some of our best work.

With UltraLink Cable, installs are fast and easy. It snakes great and the connectors fit right. The Teflon[®] core makes it the best cable for high temperature applications. Its low-loss characteristics will allow more of the signal to reach the antenna. Our all-brass mount won't corrode so it's easy to remove. Larger teeth and a soldered lug insure an excellent ground.

When the world's largest package delivery company needed antennas for their parcel tracking system, they chose the one you see here. Make the informed move to Cushcraft/Signals for all your demanding mobile applications.

Call us or your favorite distributor for your mobile and base antenna needs.

UltraLink CableTM



- Low-loss Teflon[®] dielectric
- Withstands high temperature
- Fits standard RG58 size connectors
- Easily removed dual shields
- Solid center conductor

All-Brass Mount

- Non-corroding
- Parts won't seize together
- Large grounding teeth
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AIE

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Antenna Farm

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AVA Electronics

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Cartwright Communications 103

Coaxial Dynamics

Communications & Signals

Jack Daniel Company

Decibel Products 39

Eagle Wichita 103

Eastcom Industries

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We introduced sequential cable markings, designed the self-flaring, double O-ring connector and perfected dielectric foam.

Now we've found a better way to put them all together.

Simply slip the Great Seal™ over a cable connection, pull out its plastic support coil and it instantly squeezes into a tight, form fitting sleeve that stops water migration cold. No heat shrinking, no taping, no blisters, no air pockets, no cutting, and it only takes about 3 minutes per connection. That can save you 45 minutes an hour hook-up time on every installation.

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Kenwood USA 45
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Marketronics 12
 METS
 Mobile Data Communications
 Navigation Data Systems
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 Radio
 Repco
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 CSC Power Systems
 Delcom Radio
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 Duracell
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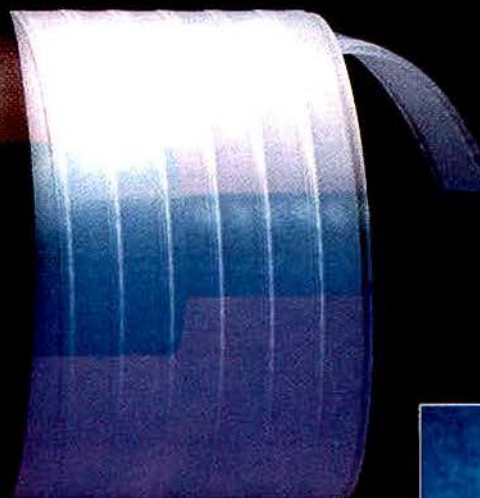
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 DIVISION OF RADIO FREQUENCY SYSTEMS, INC.

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The Communication Express	

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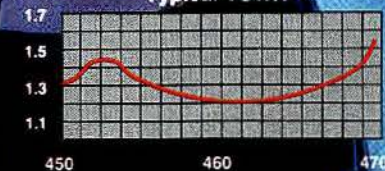
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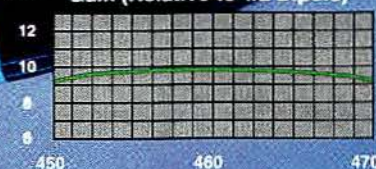
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dBd

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Midland Syn-Tech Trunking: a simple, inexpensive way to trunk existing repeaters with no major up-front investment. No interconnection, no exotic site hardware or software. It can easily double present channel loading ... and provides users a much better level of service, too!

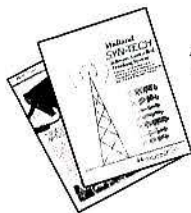
What makes Syn-Tech Trunking unique is our new "smart" mobiles — the first with all the necessary trunking logic included in their microprocessor software. They're programmable for trunked operation only, conventional only, or both, and they can co-exist with conventional radios on the same repeaters. This makes it practical to implement Syn-Tech Trunking, one user group at a time. And, with no extra-cost special equipment or installation needed, it's both simple and cost-effective.



Syn-Tech EXP™ Models are programmable for up to eight trunked/conventional channels.



Syn-Tech XTR™ Models are programmable for up to 22 trunked/conventional channels (99 optional), two trunked groups.



Free information package explains how Syn-Tech Trunking can double the capacity of your community repeaters ... and how you can get started today with virtually no capital investment. Call 1-800/MIDLAND, Ext. 1690.

MIDLAND
 LAND MOBILE RADIO **LMR**

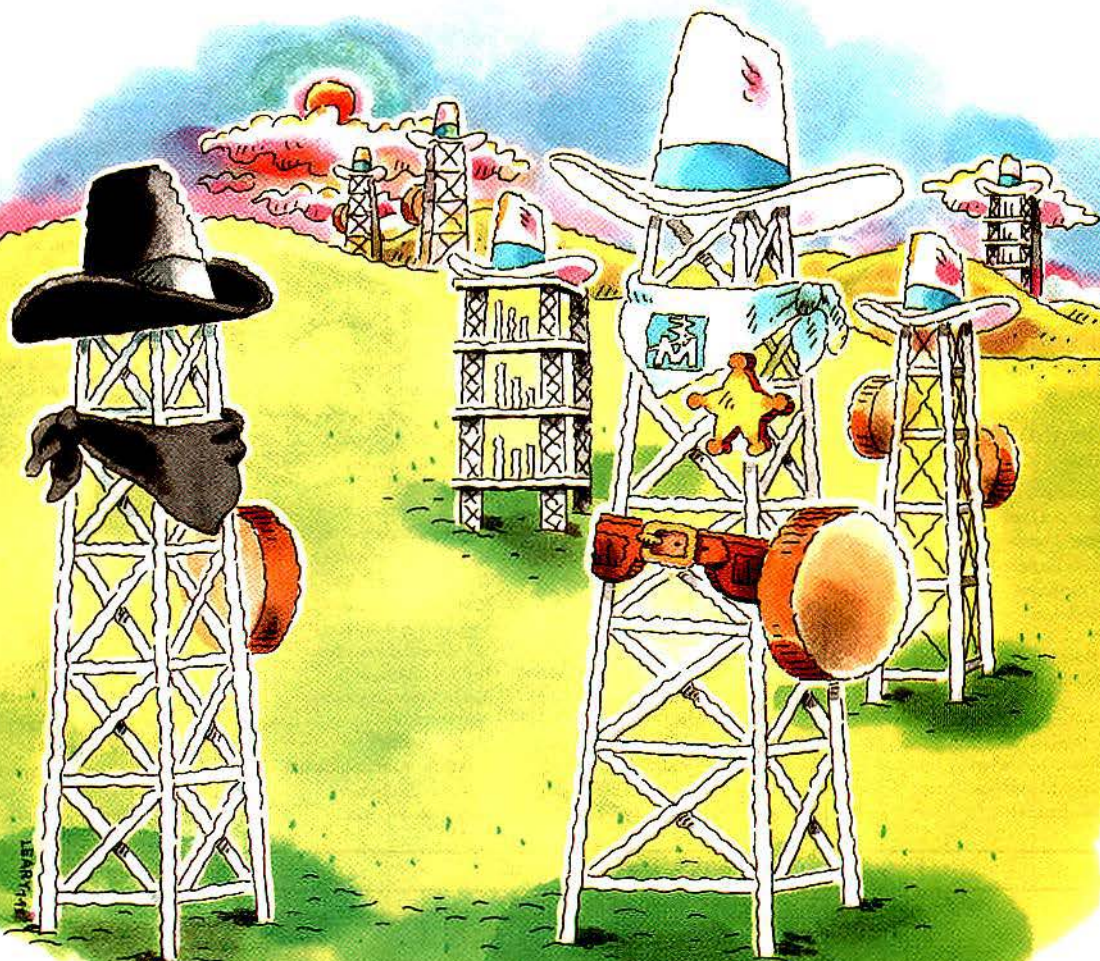
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Circle (23) on Fast Fact Card

Company Addresses begin on page 56



Nobody serves the territory like Meridian.

From the Mexican border to Santa Maria, Meridian has Southern California covered in sites and service.

Our locations are among the most sought after sites in the land. Important features such as stand-by power, air conditioning, security, and all-encompassing maintenance programs are there for the pickens. Many offer conventional and trunked community repeaters, with engineered and combined antenna systems to boot.

This kind of coverage combined with our down home way of doing business has been a family tradition since 1956. And as Meridian continues to grow — adding new sites and capabilities — you can rest easy knowing Rich and Jack Reichler are here to help. Just call our new toll free number, **(800) 400-SITE**.

We're on your side partner!

Great sites, great service, since 1956.



Meridian Communications

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(818) 888-7000 • (800) 400-SITE (7483) • Fax (818) 888-2857

Santa Fe Distributing 77

Secom Systems
 Sharp Communication
 Sigstone
 Solid-State Electronics
 Synetcom Digital
 Talley Electronics
 Telefind
 Telemobile
 TTI
 VSI Telecommunications
 Wisco International
 Zebryk Engineering

**MODULATION DEVIATION
 METERS - SEE SERVICE
 MONITORS**

**MOUNTS AND MOUNTING
 HARDWARE**

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 Allen Telecom Group
 The Antenna Company
 Auto-Comm Engineering
 Cellular Enterprises
 Cellular Solutions
Celwave 18-19
 Comark Distributing
 Communications West
 E Tip
 Eastcom Industries
Gamber-Johnson 50
Hutton Communications 34
 Jan Industrial Electronics
 JB Communications

Jon/Beau
 Manon Engineering
 MCM Electronics
 Mobile Installers Products
 Modems Plus
 PacketCluster Systems div. Harvard
 Radio

PanaVise Products 30**PathCom** 76

Primus Electronics
 Pulsar Distributing
Santa Fe Distributing 77
 Scientific Dimensions
 SMC Electro-Mount
 S&S Fabrication Poop Deck Radio

Mount Div.
 Stealth-Cellular IC

Talley Electronics
 Technostores

Tesco 99

The Communication Express
 Townsend Electronics

**PACKET RADIO
 EQUIPMENT**

Cromaack Industries
 Jack Daniel Company
 Dataradio
GLB Electronics 100
E. F. Johnson Company 35
 Kensington & Icknield
Midland Land Mobile Radio 28
 Morcom International
 Oklahoma Radio Systems ORS Paging
 PacComm Packet Radio Systems

PacketCluster Systems div. Harvard
 Radio
 Solid-State Electronics
 Southern Computer
 Synetcom Digital
 Talley Electronics
 Telemobile
 Zebryk Engineering

PAGERS

Adams Distributing
 Advanced Videotech
 Air Comm
 Auto-Comm Engineering
 Buy-Comm
 Cellnet Communications
 Cellular Wholesalers
 Communication Engineers
 Com-Tech Electronics
 Continental Leavitt Communications
 Cue Paging
D&L Communications 90

Danmax Communication

ExCellular Communications
 Hite Electronic Sales

ICM Communications
International Telecom Systems 101

Jan Industrial Electronics

Lett Electronics

M&M Communications

Marketronics 12

Maxon America

McManus Communications

Mechem Electronics

Metrocom Services

MobileComm
 Morcom International
 Mountain Communications
 National Pager Service
 NEC America
 Oklahoma Radio Systems ORS Paging
 Olympic Paging Comms
 PageRepair
 Panasonic Communications Systems
 Pekaar Communications
 Portable Depot
 Procomm USA
 R/M Wholesale Communications
 Radio Express
 Radio Wholesale Marketing
 Reach Electronics

**Shinwa Communications of
 America** 54

Smith Communications Service
 Sonar Radio

S&W Associates

Technostores

Telefind

Uniden America 11, 31

VCP International
 Wisco International
 C. W. Wolfe Communications

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DON'T TRY THIS WITHOUT A PORTAGRIP®.

If you turn an ordinary portable two-way radio holder over and give it a shake, chances are the radio will pop out. But with a PortaGrip from PanaVise, the radio stays firmly in place. This means that when you install a PortaGrip in your vehicle, your hand-held two-way radio will be right where you want it. You won't lose it during a quick stop or a sharp turn!

The PortaGrip attaches to any AMPS-compatible cellular phone mount and has independently adjustable jaws for a custom fit (holds radios 1.6 to 2.6" wide), "sure-grip" soft jaw pads that won't scratch your radio, and easy "one-hand" operation. Plus, it's competitively priced, available with or without a Slimline phone mount, and includes complete installation instructions.

So go ahead — try this test at home. But don't try it without a PortaGrip! For more information, contact PanaVise or your local representative.

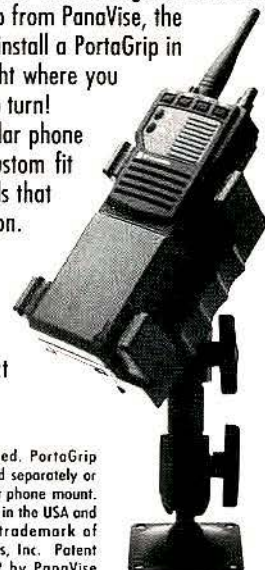
PANAVISE®

PANAVISE PRODUCTS, INC.

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Radio not included. PortaGrip (Model #701) sold separately or with a Slimline car phone mount. PortaGrip is made in the USA and is a registered trademark of PanaVise Products, Inc. Patent Pending. ©1992 by PanaVise Products, Inc.



WHAT'S THE MOST AMAZING THING ABOUT THIS RADIO.



IT'S A PHONE.

Only Uniden offers you a half-duplex radio that's also a full-duplex phone.

Your life just got easier. And business just got better. Because the SPS 330TSD radiophone is just what you need on both fronts.

This compact marvel does it all with a simple push-to-talk function. Easy-to-see large LCD display. Speed dialing and 100 number memory.

Zone scanning. Plus, many other advanced features you can only expect from Uniden.

The SPS 330TSD from Uniden. It's a radio, that's a phone. Amazing, isn't it?

For more information, please call us toll free at (800) 235-3874, extension 3639 today.

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Hite Electronic Sales
Hulton Communications 34
Information Radio Technology
Jan Industrial Electronics
Kaval Electronics 84
Kerygma Technologies
Leathersmith 96
Logotronix Communications
McManus Communications
Mechem Electronics
MobileComm
Modular Communications 81
National Pager Service
Oklahoma Radio Systems ORS Paging
Olympic Paging Comms.
PageRepair
R/M Wholesale Communications
Radio Wholesale Marketing
Reach Electronics
Real Time Strategies
SeriSystems
Signature International
Sigtone
Smith Communications Service

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Statistical Control Systems 82
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Telefind
Telemessaging Devices
Tessco 99
TSR Technologies
Wisco International
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Auto-Comm Engineering
Cartwright Communications 103
Commonwealth Communications Industries
Communication Engineers
Compuquest
Connect Systems
CTI 40
Danmax Communication
Dinet
Eastcom Industries
Ericsson Messaging Systems
ESA Telecommunications
Freeman Engineering Associates ... 37
Glenayre Electronics
Goldspar Communications
Hite Electronic Sales
ICM Communications 101
Information Radio Technology
Jan Industrial Electronics
Kerygma Technologies
Manon Engineering
Marketronics 12

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Mechem Electronics
Modular Communications 81
Morcom International
Olympic Paging Comms.
Paging Products International 61
R/M Wholesale Communications
Reach Electronics
Real Time Strategies
Shinwa Communications of America 54
Smith Communications Service
Sonar Radio
Statistical Control Systems 82
TekNow
TGA Systems
The Communication Express
Unipage
VCP International
Wisco International
Zetron 38, 67

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AER-Aerotron
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Auto-Comm Engineering
Barnett Electronics
Crescent Radio Electronics
CTI 40
Danmax Communication
DX Radio Systems
Ericsson Messaging Systems
Glenayre Electronics

Goldspar Communications
ICM Communications 101
Jan Industrial Electronics
E. F. Johnson Company 35
Marketronics 12
Mechem Electronics
Morcom International
Olympic Paging Comms.
Paging Products International 61
R/M Wholesale Communications
Ranger Communications
Reach Electronics
RF Industries (Neulink)
Schaefer Radio
Shinwa Communications of America 54
Smith Communications Service
Sonar Radio
Spectrum Communications 105
Tait Electronics 32
VCP International
Wisco International

PARTS

Bramco 93
Comark Distributing
Com-Tech Electronics
Comm-Net 2000 Communications/Manufacturing
Consumer Microcircuits 90
D&I Communications 90
DW Electrochemicals
Jan Industrial Electronics
E. F. Johnson Company 35
McManus Communications

Part 88 compliant—today!

WHEN TRAGEDY STRIKES, LACK OF COMMUNICATION IS A REAL DISASTER



Whether it's co-ordinating Search and Rescue teams or dealing with ground relief support groups, a portable communications system is an absolute priority in times of emergency.

The Tait Portable Repeater Station has been designed to be put into action immediately, effectively. Light, robust and 'showerproof', the Portable Repeater Station can handle a network of mobile and handheld radio transmissions in the most remote of terrain.

Wherever life is in danger, the Tait Portable Repeater Station brings the promise of help.



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Houston Texas 77055 USA Phone (1) (713) 984-6
Outside Texas 800 222-1255 Fax (1) (713) 468-6

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Mobile Installers Products
 Motorola Land Mobile Products Sector
 Olympic Paging Comms.
 Page Com
 R/M Wholesale Communications
 Richardson Electronics Cetron
 Communications Div.

Santa Fe Distributing 77
 Sonar Radio
 Tekk
 VCP International

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 Advanced Videotech
 Antenna Farm
 Astron
 Auto-Comm Engineering
 B&K Precision
 Best Power Technology
 Braley Communication Systems
 C&S Sales
 Cal-Scope
Cartwright Communications 103
 Cellular Solutions
 Comark Distributing
Communications Associates 24
 Contact East
 CSC Power Systems
 Eastcom Industries
 Elenco Electronics
Eriksen GE Mobile
Communications 47
 Exeltech
 Glenayre Electronics
 Helper Instruments
 Hite Electronic Sales
 HMC-Hub Material Company
Hutton Communications 34
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 Magon Engineering
Marktronics 12
 Meirick
 Metrocom Services
 Newmar
 Olympic Paging Comms.
 Power Conversion Products
 Primus Electronics
 Pulsar Distributing
 R/M Wholesale Communications
 Radio Wholesale Marketing
 Ranger Communications
 Reach Electronics
 Ritz Electronics
Santa Fe Distributing 77
 Secom Systems
 Sinclair Radio Labs
 Sonar Radio
 Speco Div. of Components
Spectrum Communications 105
 Talley Electronics
 Telemobile
Tessco 99
 The Communication Express
 Transworld
 Tripp Lite
 Unitech Industries
 VDO-PAK
Vertex/Yaesu IBC
VoCom/RF Corporation 96
 Webster Communications
Wilmore Electronics 107
 Wisco International
 C. W. Wolfe Communications
 Zirco

PRESELECTORS - SEE ANTENNA SITE EQUIPMENT

PROGRAMMERS, NAM, PROM AND OTHERS

BYTEK
 Curtis Electro Devices
 Eastcom Industries
 ETrunk Systems
 ExCellular Communications
 HMC-Hub Material Company
 Jan Industrial Electronics
 Mechem Electronics
 Sigtone
Tessco 99
Trident Micro Systems 83
 Unitech Industries
 Wisco International

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 Atlas/Soundolier
 Auto-Comm Engineering
 Broadcast Communications
 Cellular Solutions
Celwave 18-19
 Contact East
Gamber-Johnson 50
 Haewa Communications
 Jan Industrial Electronics
 Kintronic Labs
 Kyodo West
Midland Land Mobile Radio 28
 Newton Instrument
Paging Products International 61
 Power Conversion Products
 R/M Wholesale Communications
 Ritz Electronics
 Secom Systems
 Talley Electronics
Tessco 99
 The Communication Express
 Transworld
 Union Electronic Distributors

RECORDERS - SEE LOGGING RECORDERS

REMOTE CONTROL, TONE, DC AND OTHERS

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 AER-Aerotron
 Auto-Comm Engineering
 Automation & Electronics Engineering
Avtec 72
 Mark C. Bitting
Bramco 93
Cartwright Communications 103
 Comark Distributing
Combined Technologies 16
 Communications & Signals
CPI Communications 36
 Crescent Radio Electronics
D&L Communications 90
 Jack Daniel Company
 Danmax Communication
 Eastcom Industries
 Electronic Products
General Communications 69
 Gronel Associates
 Harris Farinon Div.
Hutton Communications 34
 IDA
 Jan Industrial Electronics
 Kustom Signals

Kyodo West
 Manon Engineering
Midland Land Mobile Radio 28
 Monroe Electronics
 Moseley
 Northern Controls & Communications
 PageTek
Paging Products International 61
 Parkinson Electronics
 Pekaar Communications
 Primus Electronics
 Pulsar Distributing
 Raven Electronics
 Rayfield Communications
 RTI Communications
 Schaefer Radio
 Secom Systems
Selectone 3
 SMC Electro-Mount
 Smith Communications Service
 Solid-State Communications
 Solid-State Electronics
 Syntec Communications Systems
 Talley Electronics
 Tekk
 Telemobile
Tessco 99
 The Communication Express
 Transworld
Vega 1
 Webster Communications
 Wisco International
 C. W. Wolfe Communications
Zetron 38, 67

REPEATER :

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Adams Distributing
 Advanced Computer Controls
 AmeriCom
 Auto-Comm Engineering
Bramco 93
 CES
Combined Technologies 16
 Comm-Net 2000 Communications/
 Manufacturing
 Communication Engineers
 Connect Systems
 Creative Control Products
 Crescent Radio Electronics
 D&R Associates
 Danmax Communication
 Eastcom Industries
Eriksen GE Mobile
Communications 47
 ETrunk Systems
GLB Electronics 100
 Goldspar Communications
Dong Hall Electronics 102
 IDA
 Jan Industrial Electronics
E. F. Johnson Company 35
 Kyodo West
 Manon Engineering
Midland Land Mobile Radio 28
 Northern Controls & Communications
Paging Products International 61
 Parkinson Electronics
 PCI-Pekaar Communication
 Peninsula Engineering
 Penta
 Preston Communications
 R/M Wholesale Communications
 Rayfield Communications
 RTI Communications

RTX
 Schaefer Radio
 S-Com Industries
 Sharp Communication
 Sigtone
 Southern Computer
 Telemobile
Trident Micro Systems 83
Uniden America 11, 31
 Wisco International
 C. W. Wolfe Communications
Zetron 38, 67

REPEATER:

Base

Adams Distributing
 AER-Aerotron
 Air Comm
 Auto-Comm Engineering
 Barnett Electronics
 California Radio
 Canadian Marconi
 Communication Engineers
 Communications & Signals
 Connect Systems
D&L Communications 90
 D&R Associates
Daniels Electronics 68
 Danmax Communication
 DX Radio Systems
Earmark 89
Eriksen GE Mobile
Communications 47
 ETrunk Systems
 Gabriel Electronics
General Communications 69
GLB Electronics 100
 Glenayre Electronics
 Goldspar Communications
 Hite Electronic Sales
 ICOM America
 Jan Industrial Electronics
E. F. Johnson Company 35
Kenwood USA 45
 Kyodo West
 M&M Communications
 Manon Engineering
Marktronics 12
 Mechem Electronics
 Metrocom Services
Midland Land Mobile Radio 28
 Morcom International
Paging Products International 61
 PCI-Pekaar Communication
 Peninsula Engineering
 Preston Communications
 Procomm USA
 R/M Wholesale Communications
 Radio Express
 Radio Wholesale Marketing
 Ranger Communications
Ritron 57
 RTI Communications
 Schaefer Radio
 SEA
 Secom Systems
 Sharp Communication
 Smith Communications Service
 Sonar Radio
Spectrum Communications 105
 Standard Communications
Tait Electronics 32
 Telemobile
Uniden America 11, 31
Vertex/Yaesu IBC
 Webster Communications

Wisco International
C. W. Wolfe Communications

REPEATER:**Crossband**

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Auto-Comm Engineering
California Radio
Canadian Marconi
Communication Engineers
Communications & Signals
Connect Systems
D&R Associates
Daniels Electronics 68
Danmax Communication
DataCom Systems
DX Radio Systems
Electronic Products
General Communications 69
Hite Electronic Sales
Jan Industrial Electronics
E. F. Johnson Company 35
Kaval Electronics 84
Kyodo West
Manon Engineering
Marketronics 12
Mechem Electronics
Midland Land Mobile Radio 28
Morcom International
Peninsula Engineering
Preston Communications
Procomm USA
R/M Wholesale Communications

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RTI Communications
Schaefer Radio
Secom Systems
Spectrum Communications 105
SWS Security
Tait Electronics 32
Telemobile
Uniden America 11, 31
Wisco International
C. W. Wolfe Communications

REPEATER:**Mobile**

Adams Distributing
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Barnett Electronics
California Radio
Cellular Design
Communication Engineers
Communications & Signals
Connect Systems
D&L Communications 90
D&R Associates
Daniels Electronics 68
Danmax Communication
Electronic Products
Eriksen GE Mobile

Communications 47
GLB Electronics 100
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Interconnect Specialists
Jan Industrial Electronics
Kyodo West
Manon Engineering
Marketronics 12
Mechem Electronics
Metrocom Services
Midland Land Mobile Radio 28
Morcom International
Page Com
Pekaar Communications
Peninsula Engineering
Preston Communications
Procomm USA
R/M Wholesale Communications
Radio Wholesale Marketing
Ranger Communications
Rayfield Communications
Ritron 57
RTI Communications
Schaefer Radio
Secom Systems
Standard Communications
Telemobile
Trontech 79
Uniden America 11, 31
Wisco International

REPEATER:**Portable**

Adams Distributing

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Canadian Marconi
Cellular Solutions
Communication Engineers
Communications & Signals
Connect Systems
D&L Communications 90
D&R Associates
Daniels Electronics 68
Danmax Communication
DX Radio Systems
Earmark 89
Electronic Products
Eriksen GE Mobile Communications 47
ExCellular Communications
Hite Electronic Sales
Interconnect Specialists
Jan Industrial Electronics
Kyodo West
Land Mobile Services West
Manon Engineering
Marketronics 12
Mechem Electronics
Metrocom Services
Morcom International
PCI-Pekaar Communication
Pekaar Communications
Peninsula Engineering
Preston Communications
Procomm USA
R/M Wholesale Communications
Radio Systems

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Convenient one-stop purchasing isn't all you get from Hutton. You can receive factory-caliber advice from a team that averages 14 years per person in your industry. You'll seldom experience a backorder because we maintain extremely heavy inventories. And we'll even deliver your rush order overnight when you call by 4 PM. Call toll-free to request a free fact kit.



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Happy Holidays from Hutton!

E.F. Johnson Is Proud To Announce A Little One.



If you depend on reliable LTR® communications, this is something of a blessed event. The new Viking® XR Handheld isn't just incredibly small (a hair over 6" tall). It also gives you a whole new generation of flexibility. With *User-Select™* programming, radio features can be changed without a PC. It's the latest addition to the Viking family. And at \$850, it's going to make handheld radio users out there very happy. For a full demonstration, call 1-800-328-3911, ext. 6380. We'll give you the name of your nearest E.F. Johnson dealer.



The Practical Choice™

Radio Wholesale Marketing
 Ranger Communications
Ritron 57
 Schaefer Radio
 Secom Systems
 SWS Security
 Syntec Communications Systems
Tait Electronics 32
 Telemobile
Transcrypt International 5
Uniden America 11, 31
 Wisco International

RF FILTERS - SEE ANTENNA SITE EQUIPMENT

RF LINKS

Adams Distributing
 Advanced Tech Com
 AER-Aerotron
 Auto-Comm Engineering
 Canadian Marconi
 Carlson Communications
 Catcom Systems
 Comm-Net 2000 Communications/
 Manufacturing
 Communications & Signals
 D&R Associates
 DataCom Systems
 DX Radio Systems
GLB Electronics 109
 Glenayre Electronics
 Hite Electronic Sales
 IDA
 Jan Industrial Electronics

E. F. Johnson Company 35
Kaval Electronics 84
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 Manon Engineering
Marktronics 12
 Monicor Electronics
 Norand
 Northern Controls & Communications
 Nutel Electronics
 Paging Products International
 R/M Wholesale Communications
 Radio Systems
 Rayfield Communications
 Repco
 RF Industries (Neulink)
Ritron 57
 RTI Communications
 RTX
 Schaefer Radio
 Secom Systems
 Solid-State Electronics
Spectrum Communications 105
 Synetcom Digital
 Tactical Electronics
Tait Electronics 32
 Talley Electronics
 Telemobile
 The Communication Express
 TorFino Enterprises



**WESTERN®
 MULTIPLEX
 CORPORATION**

Western Multiplex

Wisco International
 Zebryk Engineering

SCANNING RECEIVERS (SCANNERS)

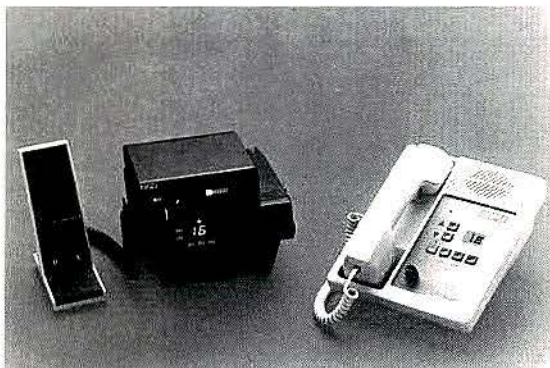
Ace Communications Monitor Div.
 Adams Distributing
 Cellular Wholesalers
Communications Associates 24
 ICOM America
 Jan Industrial Electronics
 Kyodo West
 Norand
 Official Scanner Guide
 Ranger Communications
 Research Electronics
Santa Fe Distributing 77
**Shinwa Communications of
 America** 54
 Simrad
 Synetcom Digital
 Talley Electronics
 Technostores
 Telemobile
 TSR Technologies
Uniden America 11, 31

SCRAMBLERS, ENCRYPTION DEVICES

Adams Distributing
 Auto-Comm Engineering
**Bendix/King Mobile Communications
 Div.** 75
 Cellular Solutions

Cellular Wholesalers
 Communication Engineers
 Communications & Signals
Consumer Microcircuits 90
 Cromack Industries
 Cycomm
 Danmax Communication
 Eastcom Industries
**Ericsson GE Mobile
 Communications** 47
 GRE America
Hutton Communications 34
 Jan Industrial Electronics
E. F. Johnson Company 35
 Kyodo West
 Mechem Electronics
Midian Electronics 43
Monark International 104
 Morcom International
MX-COM 7
 PacketCluster Systems div. Harvard
 Radio
 Primus Electronics
 Pulsar Distributing
 Research Electronics
Selectone 3
 Sigtone
 Smith Communications Service
 Synetcom Digital
 Talley Electronics
 Telemobile
Tesco 99
Transcrypt International 5
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 Wisco International

GET CONTROL...



...Remote control, of upto 16 channels - Radius M200, GM300 & Maxtrac 300 series radios

The CPI model MCR210 remote and MCR series interface panel will allow you to remote control Radius or Maxtrac radios, upto sixteen channels, over any two wire voice grade circuit.

The MCR210 remote control system provides LED displays for remote channel indication, channel up and down buttons, PTT indicator, on-hook PTT capability, monitor button and indicator, intercom capability between parallel remotes and the radio, scan control button and indicator for those radios so equipped and speaker volume control.

Features

- Simple installation - No soldering, cutting or crimping.
- Provides remote channel indication.
- Does not require B308 option.
- Remote transmissions heard over radio speaker
- Radio transmissions monitored on remote speaker
- Uses any two wire voice grade circuit.



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 (214) 437-5320 • FAX (214) 437-5360 • (800) 869-9128

Circle (30) on Fast Fact Card

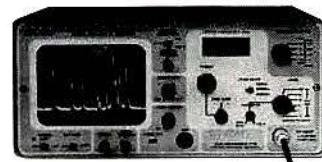
AVCOM's New PSA-65A Portable Spectrum Analyzer

The newest in the line of rugged spectrum analyzers from AVCOM offers amazing performance for only **\$2,855.**

AVCOM's new **PSA-65A** is the first low cost general purpose portable spectrum analyzer that's loaded with features. It's small, accurate, battery operated, has a wide frequency coverage - a must for every technician's bench. Great for field use too.

The **PSA-65A** covers frequencies thru 1000 MHz in one sweep with a sensitivity greater than -95dBm at narrow spans. The **PSA-65A** is ideally suited for 2-way radio, cellular, cable, LAN, surveillance, educational, production and R&D work. Options include frequency extenders to enable the **PSA-65A** to be used at SAT-COM and higher frequencies, audio demod for monitoring, log periodic antennas, 10KHz filter for .2 MHz/DIV range, carrying case (AVSAC), and more.

For more information, write, FAX or phone.



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 FAX 804-794-8284

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THE WINDOW OF OPPORTUNITY HAS OPENED

PCS marks the dawn of a new era in personal communications systems. Freeman Engineering is, once again, a frontrunner in developing technology destined to become the industry standard.

Capable of handling "Meet Me", land to mobile calls, cellular, paging, and PSTN calls, Freeman's PCS Switch is completely adaptable to the user's specific requirements. For details, call us. We've not only taken our PCS Switch off the drawing board, we've put it into practice. Freeman's PCS Switch is in service and on line in New Orleans, Louisiana under an experimental PCS license.

Freeman Engineering. The window is open and the winds of change are blowing.



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Circle (32) on Fast Fact Card

SELECTIVE CALLING - SEE SIGNALING

SEMICONDUCTOR TESTERS

C&S Sales
Elenco Electronics
Jan Industrial Electronics
Santa Fe Distributing 77
Union Electronic Distributors

SERVICE MANUALS

B&K Precision
Curtis Electro Devices
Jan Industrial Electronics
E. F. Johnson Company 35
MCM Electronics
Official Scanner Guide
Sonar Radio
Tessco 99
C. W. Wolfe Communications

SERVICE MONITORS AND MODULATION DEVIATION METERS

AIE
Alcom Electronics
Antenna Farm
Auto-Comm Engineering
Barnett Electronics
Canadian Marconi
Com-Ser Labs
Communications Associates 24

CUSHMAN

Cushman/KNS Electronics 102
Electronic Products
Helper Instruments



Hewlett-Packard 66
Hutton Communications 34
IFR Systems 21

Jan Industrial Electronics
NS Electronics Service
PMC Associates
Rohde & Schwarz
**Schlumberger Technologies
Instruments Div.** 51

Secom Systems
A.W. Sperry Instruments
Talley Electronics
Technostores
Tekno Industries
Tessco 99
Wavetek Communications Div. 41
Webster Communications
Wisco International

SHELTERS

Adelphon
Altell Supply

Auto-Comm Engineering
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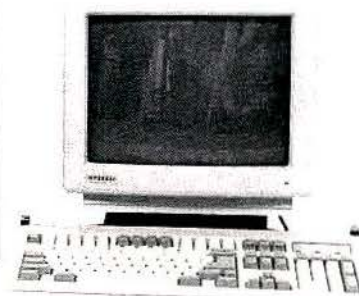
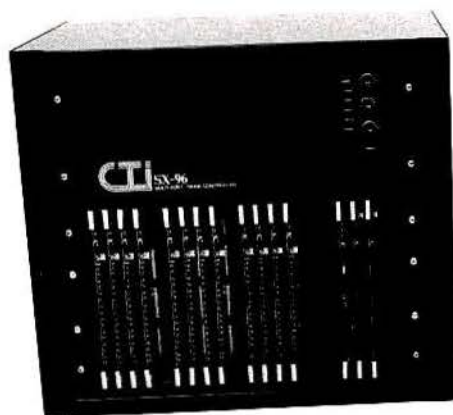
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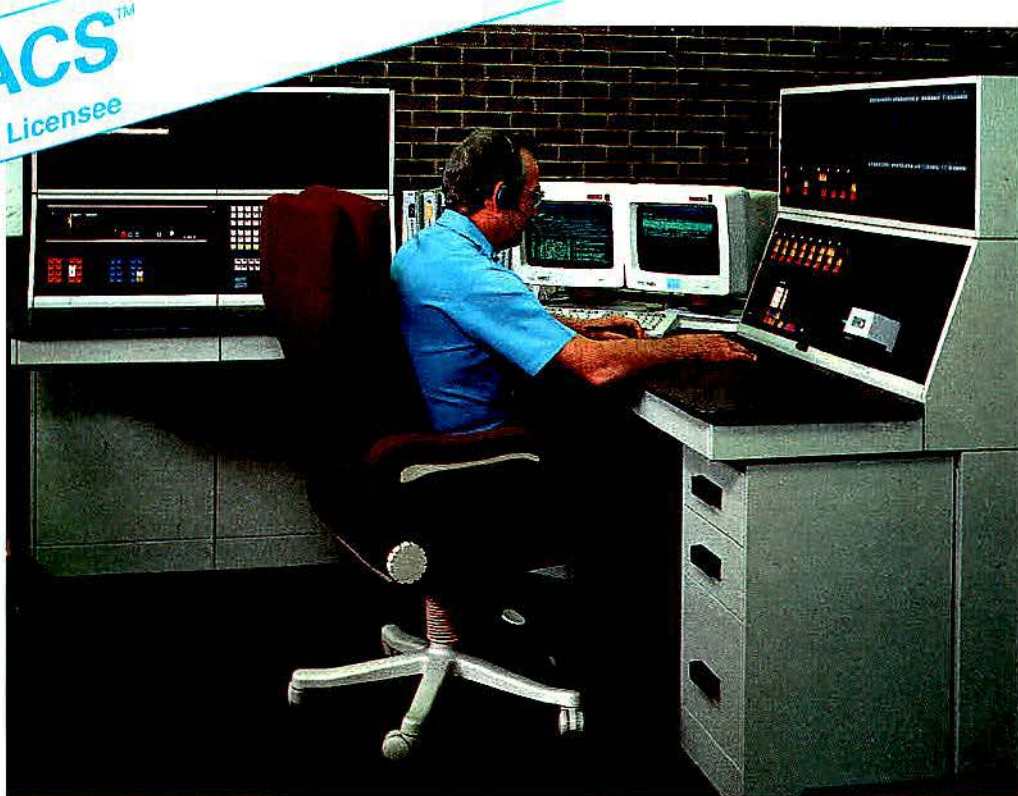
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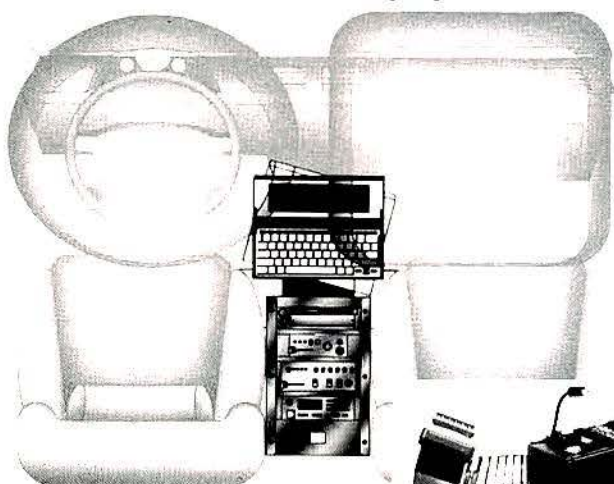
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Wide Band Operation:
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Scan
Tone Coded Squelch
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Two-Tone Sequential Decode
Rugged, Uni-Body Housing
Two Year Factory Warranty
Made In USA

VHF \$429 UHF \$449



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16 channels
30 Watts VHF 25 Watts UHF
Frequency Bands: 136-174
400-430, 450-512 MHz
Wide Band Operation:
VHF 15MHz/UHF 20 MHz
Scan
Tone Coded Squelch
Digital Coded Squelch
Two-Tone Sequential Decode
Rugged, Uni-Body Housing
Two Year Factory Warranty
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VHF \$469 UHF \$499



*Portable comes with: battery, antenna, wall charger and belt clip.
Optional accessories: DTMF keypad, speaker microphone, earphone
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Band-It-Index

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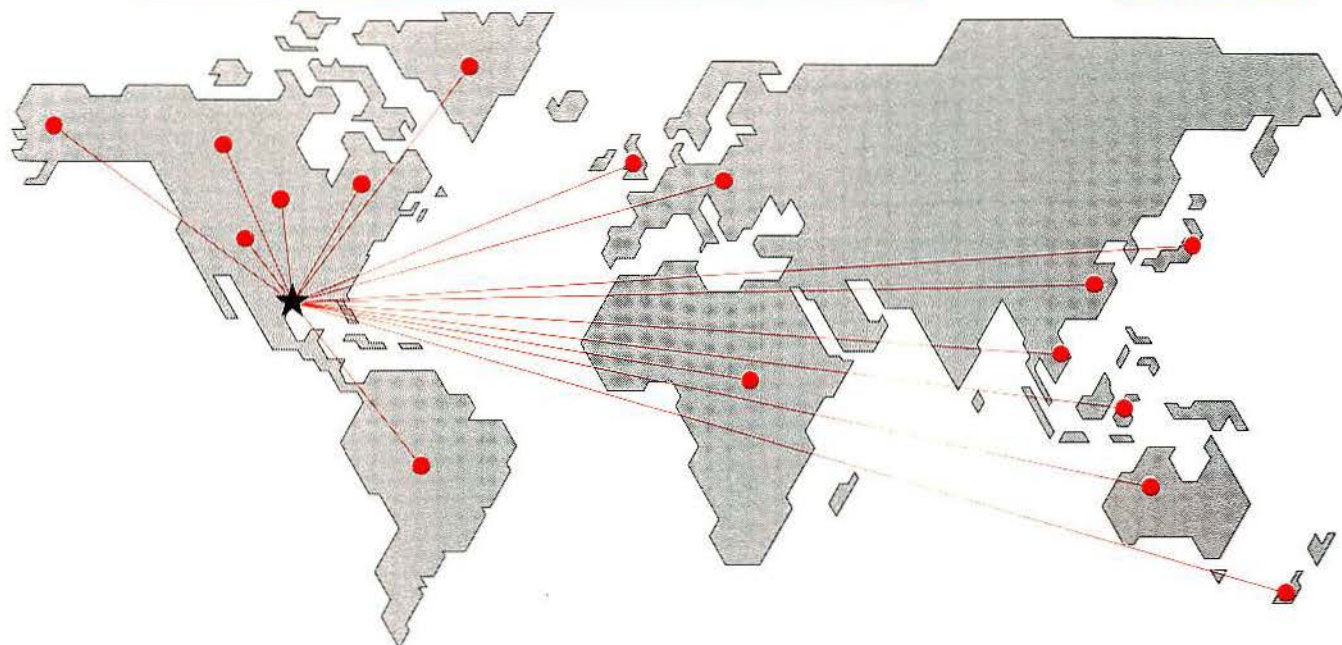
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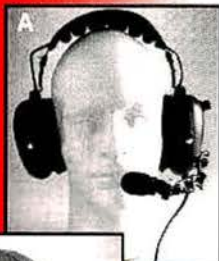
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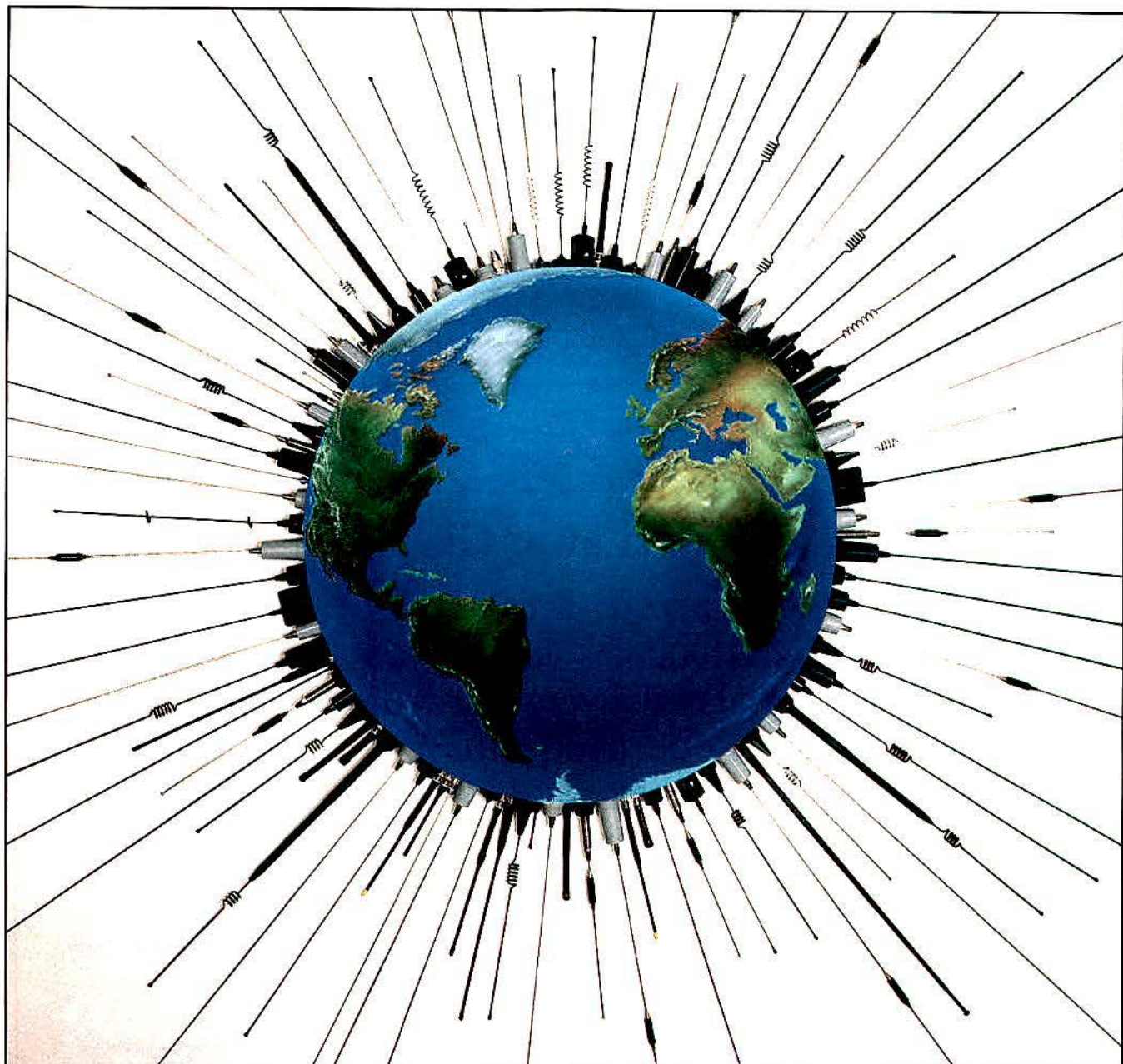


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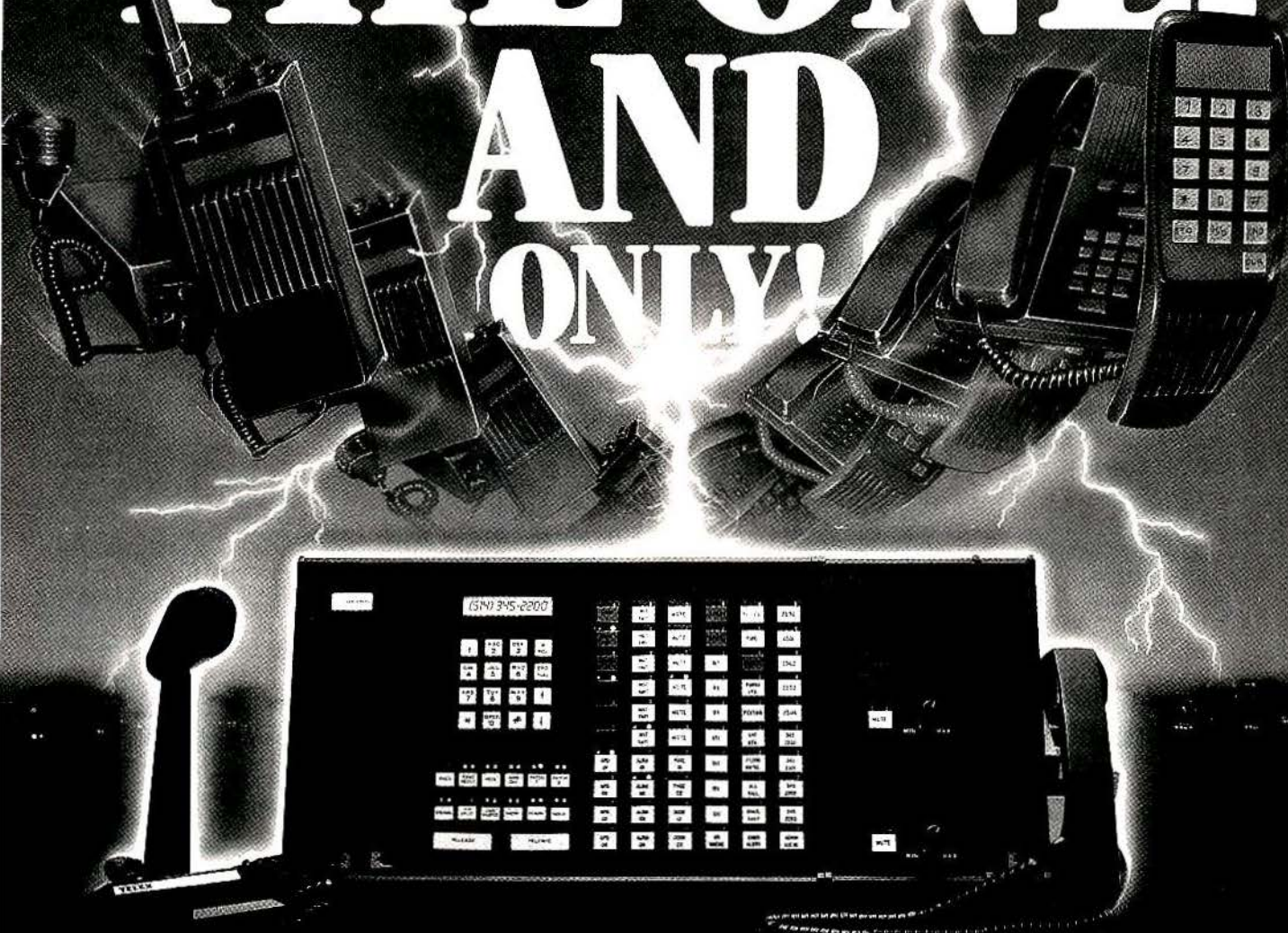


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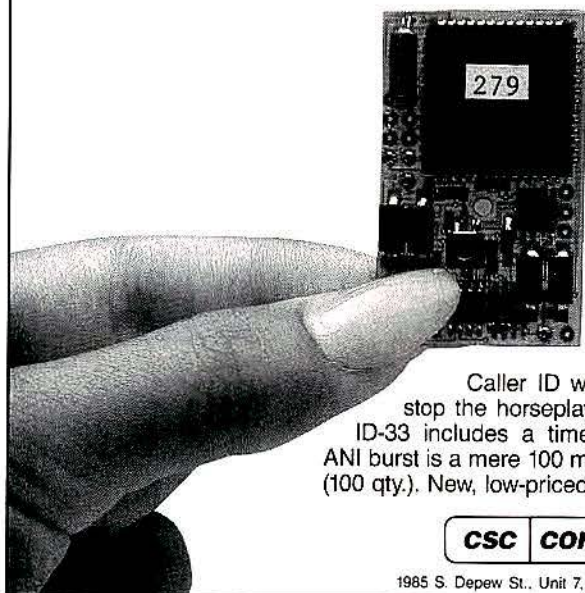
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Product Directory begins on page 12

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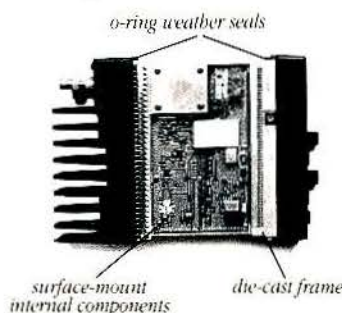
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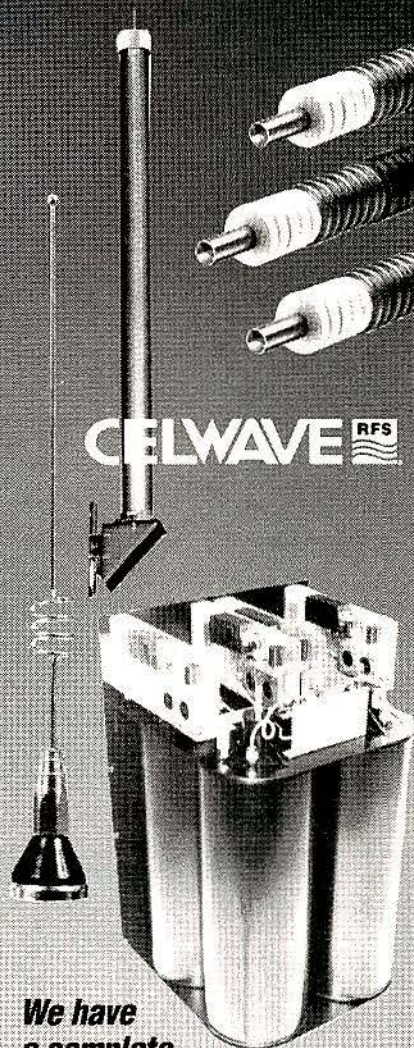
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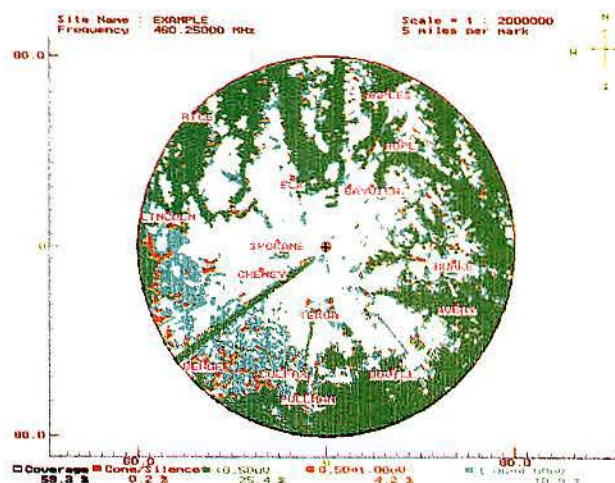
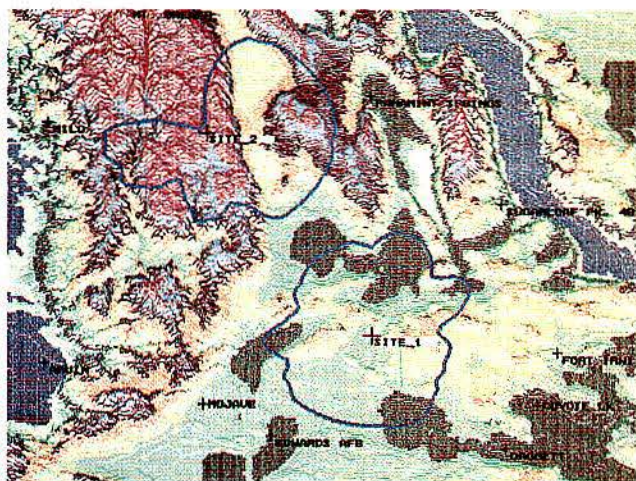
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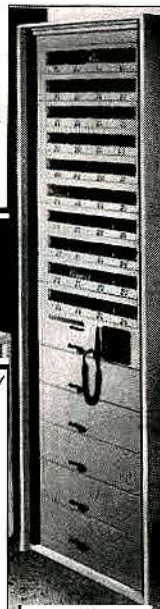
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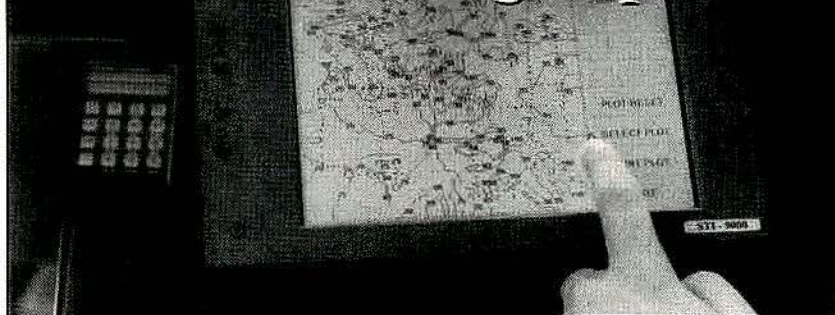
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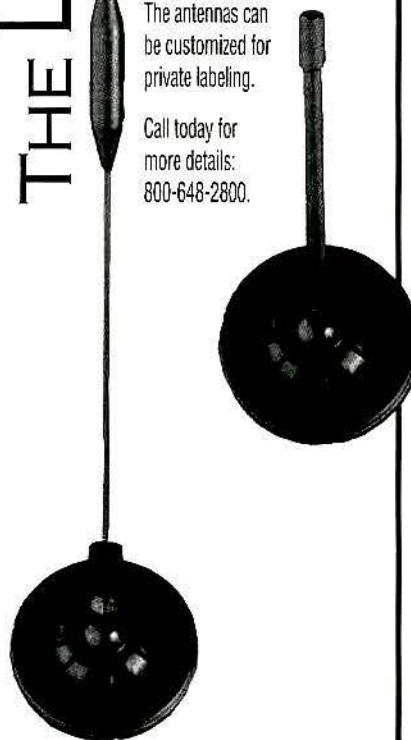
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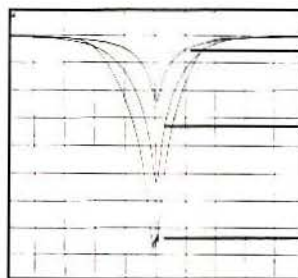
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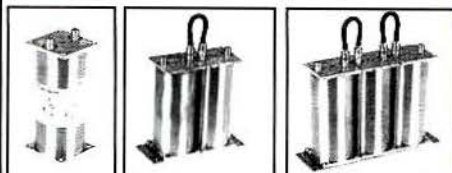
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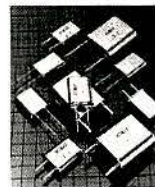


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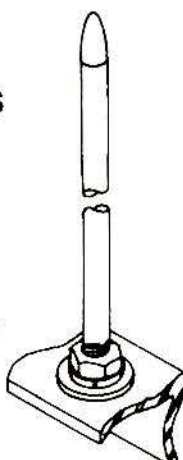
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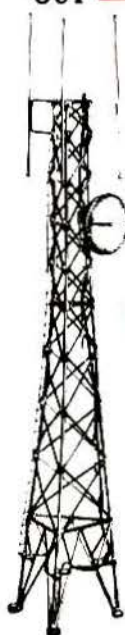
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D

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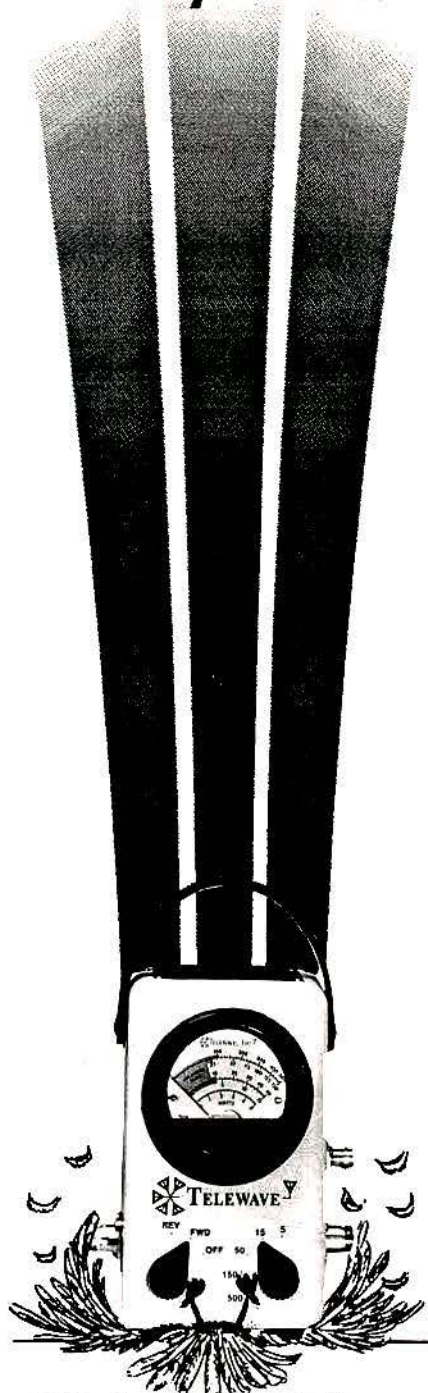
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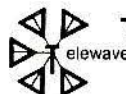
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Alan Shark, president

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Ronnie Rand, executive director

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202-639-2215
Hugh Henry, executive director, communications and signals

Cellular Telecommunications Industry Association (CTIA)
1133 21st St. NW, Third Floor
Washington, DC 20036
202-785-0081
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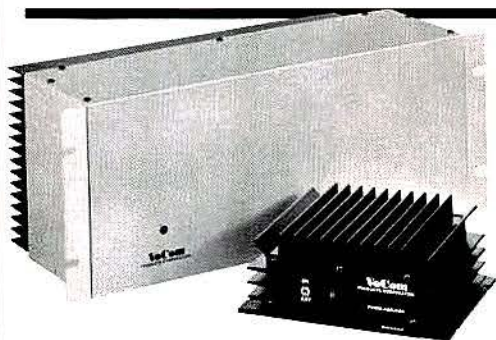
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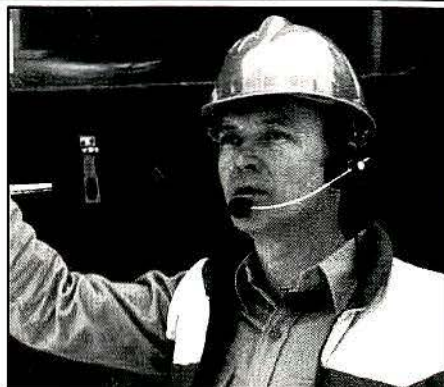
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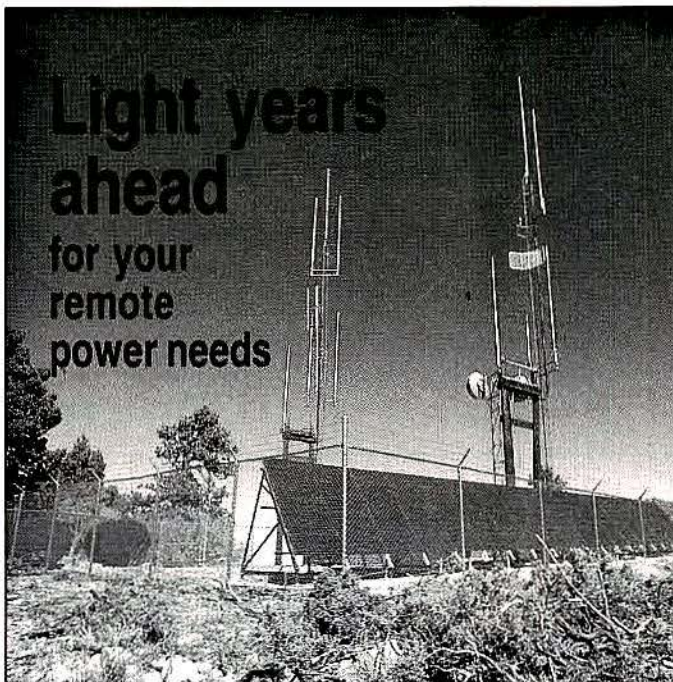
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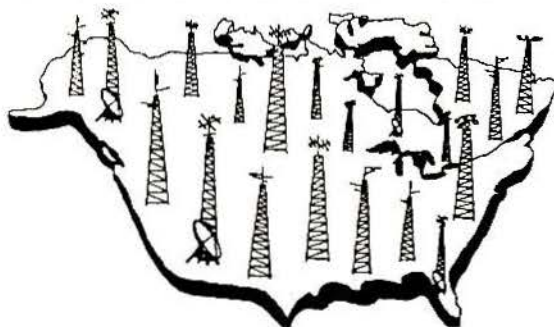
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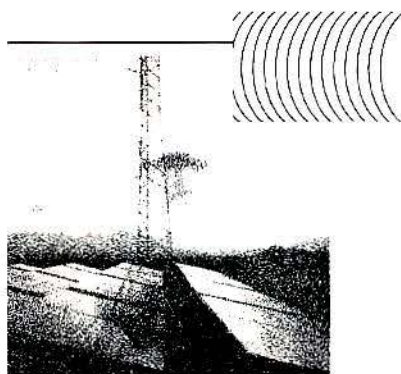
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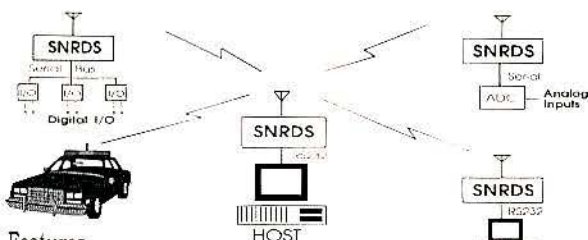
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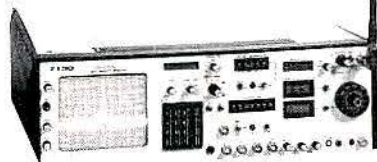
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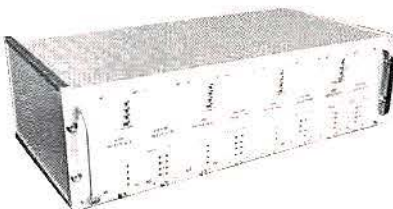
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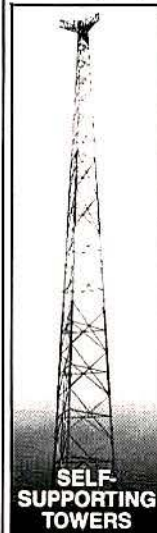
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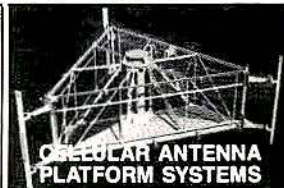
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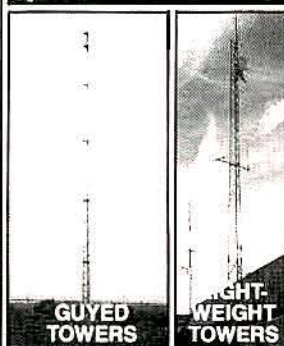
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Spit balls and corked bats

By Robert H. Schwaninger, Jr.

It has been said that "Life imitates baseball." There is an almost perfect symmetry to the diamond. The challenge between pitcher and batter demonstrates a natural purity of motion and nerve. And the strategic partnering between short stop, second baseman and first, sings in the turning of a double play. When all is right, baseball is harmonious contest at its finest.

The provision of telecommunications service to the public is also intended to be a harmonious contest. Each dealer or operator sets its line-up of services and frequencies. Cooperating companies can turn a double-play to turn local coverage into regional. And subscriber contracts are often snared on the run before they go over the wall and into the seats.

But sometimes there is no joy in Mudville. Upsetting the harmonious con-

Schwaninger, MRT's regulatory consultant, is a partner in the law firm of Brown and Schwaninger, Washington, DC.

test is the cheater who looks to get an unfair edge on the competition. Ever since 1902, when George Hildebrand discovered that a little saliva on horsehide could make a pitched ball do weird and terrible things, some pitchers have accessorized their uniforms with Vaseline. Ever since it was

The FCC is the industry's umpire. It calls balls and strikes in licensing, litigation and rulemaking.

discovered that a lighter bat provides greater bat speed and thus, delivers more power, the lumber has been periodically plugged with cork.

In radio, there have always been the bootleg operators who have decided that

they do not need to get a license and cooperate with other operators. There have been the jammers and the time thieves and the cable tappers. Just as in baseball, there have long been the cheaters who seek to gain an unfair advantage over their competition.

Baseball has its umpires. The portly men in black will periodically tramp out to the mound to frisk the pitcher. They examine the ball between pitches to see if it shows scuff marks, and when a broken bat results in a rain of Super Balls (Greg Nettles, 1974), the umpire is the guy who promptly tosses the player from the field.

The FCC is the industry's umpire. It calls balls and strikes in licensing, litigation and rulemaking. When an operator fails to follow proper procedure, the FCC is ready to call a balk and let the opposition take another base. The parallel continues if you consider that an application returned for more information is like a foul ball; you get another chance to get a hit.

The umpire's responsibility is weighty. He is responsible for the integrity of the game, and when that integrity is seriously challenged, a baseball commissioner steps

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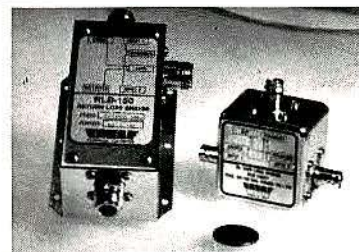
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forward and exacts a penalty from the cheaters "for the good of the game." But have you noticed that such punitive actions only occur when the umpire is an eyewitness?

As in baseball, the FCC rarely will take action against an operator unless the Commission's personnel actually witness the infraction. It is as though nothing happens unless an FCC employee is present. This requirement arises out of the FCC's distrust of the industry. Even a cheater who totally destroys another's business will not be found liable by the FCC unless its employees witnessed the destruction.

I know of a case where the FCC was provided with video tapes that fully demonstrated intentional interference by an operator. Given the FCC's lack of a response, it appears that the Field Operations Bureau has not yet adopted the "instant replay." The FCC has received verified test reports, affidavits, third-party testimony from subscribers and every other form of evidence to prove that an operator was cheating. The FCC has eschewed all of it, stating, in effect, the old baseball umpire axiom, "Until I call it, it didn't happen."

Adding to the problem is the FCC's apparent inability to admit when it is wrong. Once the call is made, the FCC will argue vociferously in defense of its position, regardless of whether it knows that the initial call was blown (a la Don Denkinger, 1985 World Series). For really embarrassing blown calls, it falls back on its discretion to enforce its rules. To avoid blown calls, the FCC often opts to do nothing, going to extraordinary lengths to "conserve its scarce resources" and defend the rights of the accused, examining all mitigating factors, and determining that cooperation between operators should be promoted. When this policy is applied, it results in legitimate businesses being destroyed and cheaters getting off.

There are some encouraging signs. Beanball artists are being suspended without pay. Ruffians looking for any excuse to charge the mound are getting the hook. Pete Rose is still in baseball's Twilight Zone. Slowly, integrity is being foisted on often unwilling players who believe that they are larger than the game itself.

Similarly, the FCC has been handing out more and more fines. Equipment manufac-

turers are more often placed under scrutiny. Marine operators are being told to get a license and use the radio responsibly. Jamming amateurs are being fined and sometimes hauled into court when their antics include disrupting public safety operations. These are all encouraging signs that perhaps the FCC is slowly coming around toward favoring the honest player over the cheater.

But the fact that the FCC has a long way to go was apparent in the recent Capitol Radiotelephone, Inc. case where the operator was slapped with a Hearing Designation Order, Order To Show Cause and Notice of Opportunity For Hearing (FCC

93-381), after it was alleged that the operator was intentionally jamming the competition with bogus paging. On first blush, it appears that the FCC stood up tall for the rights of the victim, demanding a hearing to determine whether the accused has the character quali-

fications to be a licensee and levying a \$20,000 fine to boot. Strong stuff.

However, a careful reading of the facts shows that the FCC didn't take action until its own personnel monitored the errant activity on numerous occasions, which took several months. Even then, the FCC still held out opportunities to the allegedly interfering operator to clean up its act. It was only after the FCC was rebuffed by the operator that the harsh enforcement action was issued. Sort of reminds one of George Steinbrenner's stance before Commissioner Bart Giamatti.

As the FCC embarks on its next major player-development deal, PCS, it might do well to take a page from the hit movie, "Field Of Dreams." In the movie the main character is told, "If you build it, they will come." And the first spirit that stepped onto the field was "Shoeless" Joe Jackson who was one of the Chicago "Blacksox" banned for having a part in throwing the 1919 World Series.

*As in baseball, the FCC
will rarely take action
against an operator
unless the Commission's
personnel actually
witness the infraction.*

Mobile Radio Technology

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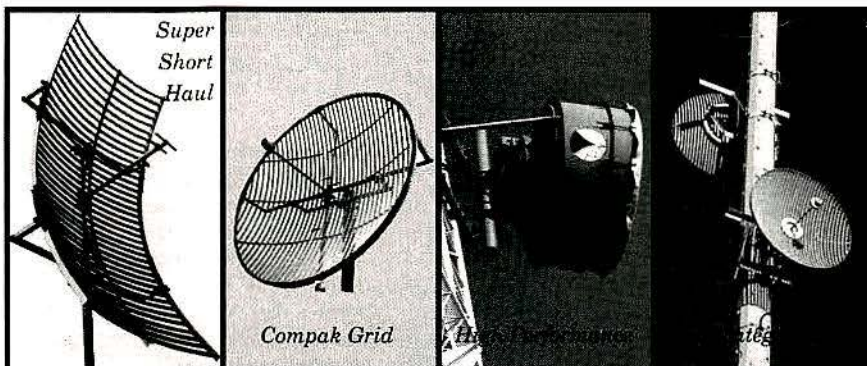
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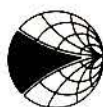
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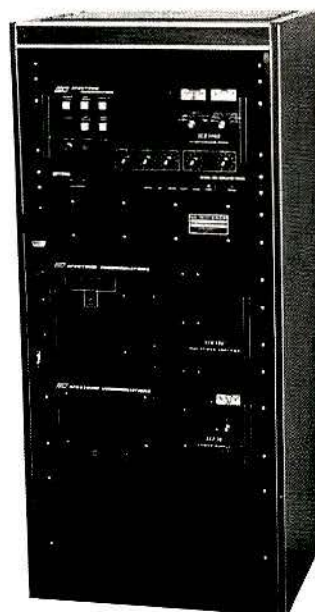
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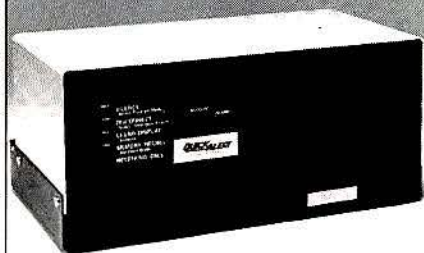
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L etters to the editor

NiCd batteries:

Keeping nickel-cadmium (NiCd) batteries on hand for our train crews has been an impossible and perpetual problem.

Batteries were swapped out at hundreds of locations along the railroad line 24 hours a day. With different shifts, control was impossible. Hundreds of batteries disappeared each month.

With the new Motorola HT600 high-capacity battery, memory effect became a critical problem with low-use users exchanging batteries with high-use users.

The solution was to purchase an Underwriters Laboratories (UL) approved single-slot charger for each person assigned a radio and to reduce the number of radios in pool use. This solution was a long project that started with our quality program.

First came the purchase of thousands of portable radios to be assigned individually. Several years later, after a continuing shortage of batteries, the decision was made to assign the chargers and batteries.

Charging instructions were issued with each charger and battery distributed. I gave instructions to keep the same batteries and to use them the same way each day.

The program has been in effect for five

months, and our battery consumption finally has been reduced to manageable levels. All radio shops have new battery analyzer-conditioners. Most of the batteries turned in for testing are more than 1.5 years old, out of warranty, and do not respond to reconditioning.

Robert Kovacich
Lead radio maintainer
Consolidated Rail
Hammond, IN

* * *

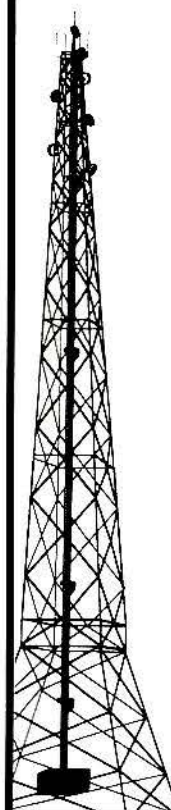
Directional wattmeters:

In the September 1993 issue, a letter from Wayne Openlander derides the "obsolete" directional wattmeter and praises the virtues of RF network analyzers.

Many of the letter's points are valid, but when taken as a whole, they give the impression that the directional wattmeter no longer has a place in a service shop inventory. I beg to differ.

Directional wattmeters are quick and (not so) dirty. In the vast majority of

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troubleshooting scenarios, they are "close enough for government work." And they shine in the heavy-handed environment of radio installation into automobiles and for tower work.

The thought of a pricey RF network analyzer in the hands of some of the gorilla-grip installers I have worked with, or the thought of one bouncing off a tower leg at the generally awkward work area where antenna meets coaxial cable makes me blanch.

Through much personal experience, I (and hordes of others) have used directional wattmeters even to determine whether a source of reflected power is at the radio end or the antenna end of a transmission line, and quite often at points in between, with great reliability.

The directional wattmeter has long been the technician's personal sidearm and should not be so readily dismissed. It does not take an elephant gun to shoot a squirrel.

Mike Mckelburg
Communications Consultant
Public Safety Radio Systems
Ajo, AZ

Fast Fact Card comments:

The two toughest problems facing me on the job are:

- maintaining and optimizing trunked simulcast (5-site) 10-channel prime site.
- routine maintenance of six microwave radios at my site with shared equipment.

Jack W. Weinmann
Senior Electrical Tester
Cleveland Electric Illuminating
Mayfield Village, OH

The two toughest problems facing me on the job are:

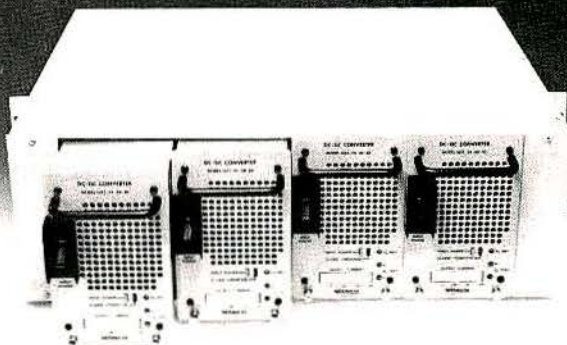
- attaining sole-source replacement parts from offshore manufacturers.
- competing with fly-by-night dealers in today's poor market.

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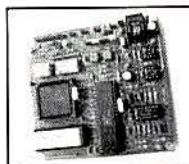
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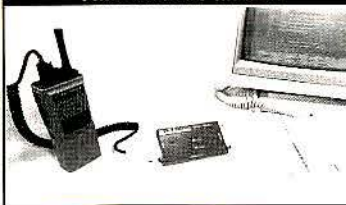
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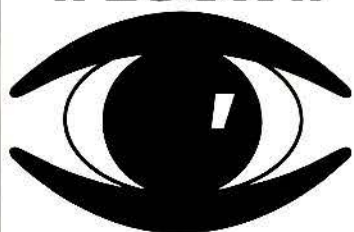
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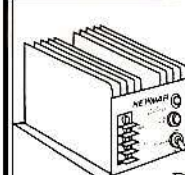
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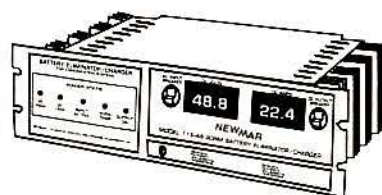
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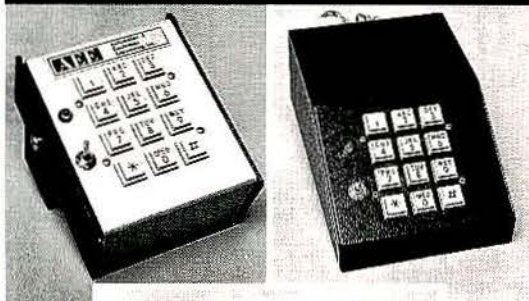
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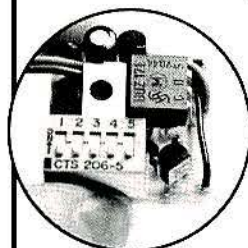


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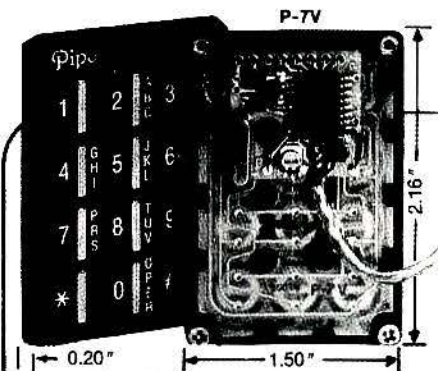
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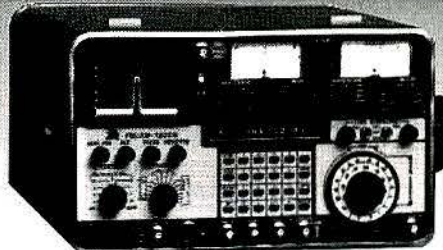
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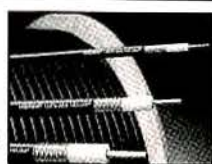
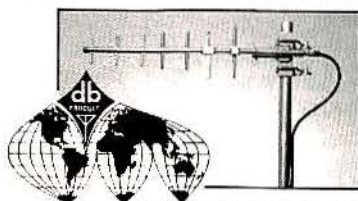
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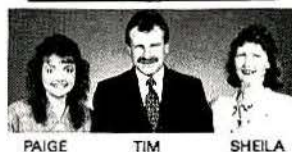
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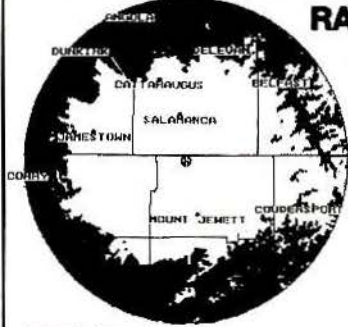
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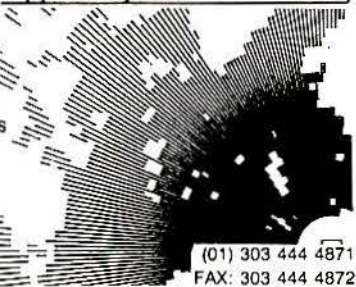
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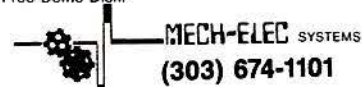


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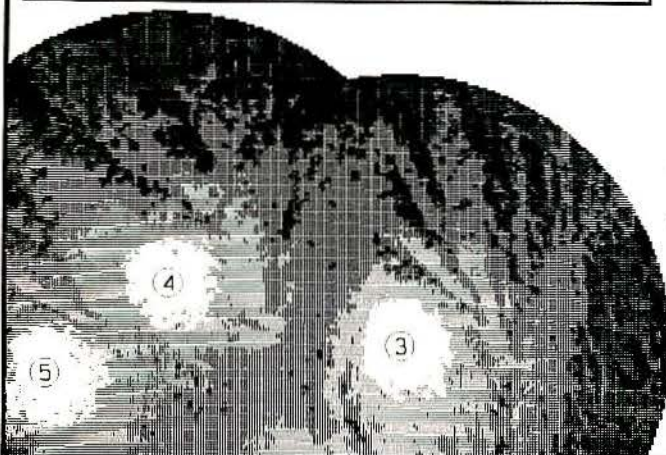
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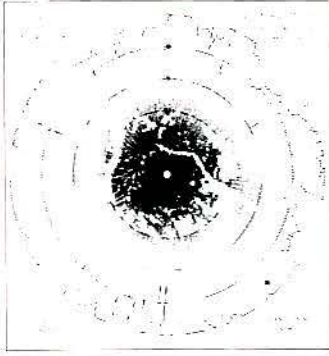
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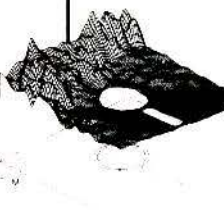
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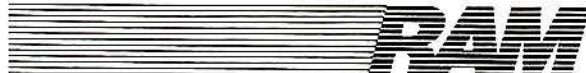
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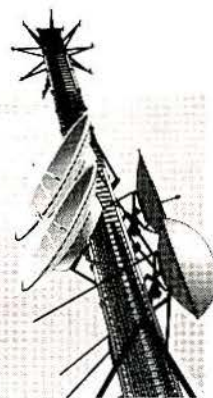
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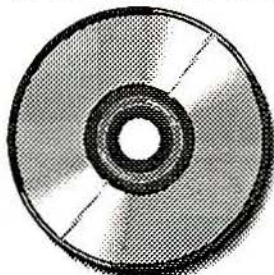
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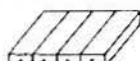
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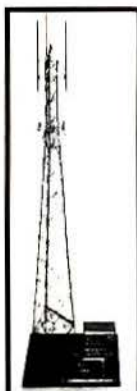
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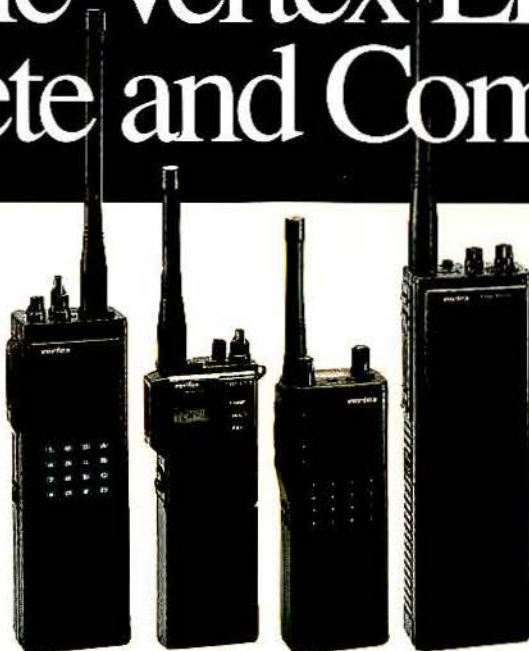
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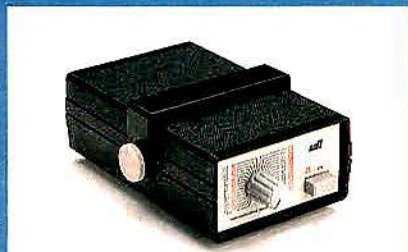
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